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Waterproofed Writing Paper

G. E. van Gils[1]

IT IS of some importance to be able to obtain a paper on which it will be possible to write even in a pouring rain. There is no person who, having to work in the open, will not have regretted the fact that his notebooks, maps, or other papers on occasions were soaked with rain and had become useless.

The incentive to deal with this problem was provided by an article published by C. N. A. De Voogd and Z. Salverda in 1937.[2]

It is known that paper and other material can be made waterproof by coating them with latex. But this method has the disadvantage that one cannot any longer write on it with a pencil. This disadvantage, however, we were able to overcome to some extent by mixing a small quantity of finely powdered glass through the latex. But even so, the paper could not adequately be used for writing, and it was only when the quantity of the admixture of powdered glass was increased very greatly as compared with the quantity of rubber used, that the surface of the paper became sufficiently rough. But this again had the disadvantage that, through the large quantity of powdered glass mixed in with the rubber, the waterproofing quality of the rubber layer greatly deteriorated.

Upon closer investigation it was found that of the total quantity of the glass mixed in with the latex only a very small proportion was active. In coating the paper with latex, usually done by smearing the latex with a brush on to the paper which was kept in a horizontal position, the glass particles very soon began to settle, with the result that the upper surface of the rubber coating contained too few of the glass particles to make it sufficiently rough. Such settling of glass particles in latex can be readily observed in a glass container.

It has now been found that this settling can be counteracted by adding a creaming agent to the mixture of glass and latex. At first sight this is a very remarkable phenomenon. Through adding a creaming agent to latex one induces, as is generally known, a creaming action. Now if previously a very minute quantity of glass powder is mixed in with the latex, the glass particles rise together with the latex particles. Underneath we find a clear serum, and at the bottom of the container is no trace of any sediment. If a large quantity of powdered glass is added to the latex, then also the glass particles will become "chained" to the rubber particles by the molecules of the creaming agent; but in view of the fact that the amount of glass is rather large, the glass particles, because of their higher specific gravity, will proceed to carry along the rubber particles. In such case there will be no creaming, but sedimentation, as we find the "creaming" layer at the bottom of the vessel, while the serum layer is on top. Also there is no question of any separate glass particles being precipitated, provided the powdered glass does not contain grains that are too coarse.

The phenomenon here described further supports our conception of the mechanism of the creaming process previously described by us.[3] According to this conception, the latex particles, and also other particles that may be present, are linked together by the action of the long molecules of the creaming agent. In this way clusters are formed which, according to whether they are of higher or lower specific gravity than the surrounding liquid, will either cream or settle.

Thus it is that, if a little of the creaming agent is added to the mixture of latex and powdered glass, a comparatively small quantity of glass powder will be sufficient to produce a quite satisfactory writing surface. We preferably used creamed latex, because in this manner it was avoided that, as a result of the adding of the creaming agent, the creaming would recur. However, if the mixture started creaming again, then the serum was siphoned off.

Recommended Method

The entire method can be divided into the following activities.

Improving the Wetting Properties of Paper

To this end the paper is spread horizontally over a glass plate and is then given a coating on both sides of a 2% solution of Igepon or of a soap solution of like strength. Thereupon the paper is hung up to dry.

[1] Department of Rubber Research of the Experimental Station West Java, Buitenzorg, Java.
[2] *Tectona*, June, 1937, p. 535.
[3] *Arch. Rubbercultuur*, 23, 256 (1939).

Waterproofing

For this purpose the paper is spread over a glass plate and painted or sprayed with a vulcanizing latex mixture.

Satisfactory results were obtained with a mixture of the following composition:

MIXTURE 1

Creamed latex	100.0 ml.
Kaolin	15.0 g.
Sulphur	1.5 g.
Zinc Oxide	1.5 g.
Ultra-accelerator (e.g. P extra N)	0.5 g.
Casein solution 10%	5.0 ml.
Igepon solution 5%	20.0 ml.
Paraffin emulsion 20%	5.0 ml.

The creamed latex is added after all of the other ingredients have been thoroughly mixed in a ball mill.

Before application, this entire mixture is diluted with 10 to 20 ml. of water. It is preferable to apply a diluted mixture twice, than a more concentrated mixture only once. Air bubbles should be avoided as much as possible. A thin rubber layer is more than sufficient. Paper properly prepared is tinted only very slightly yellow.

Preparing the Paper for Writing

After the paper has been waterproofed on both sides in the manner here described, the following mixture is applied:

MIXTURE 2

Refined glass powder	30 g.
Igepon solution 5%	30 ml.
Creamed latex	100 ml.
Konnyaku meal solution 1%	50 ml.

One single application suffices.

The solution of Konnyaku meal, either through centrifuging or sieving through a cloth, must be freed of the undissolved grains and other coarse particles. In view of the fact that Konnyaku meal is subject to a very considerable degree of enzymic and bacteriological decomposition through which it becomes inactive, the above-described mixture is best prepared shortly before being applied and, where necessary, kept in a refrigerator. The addition of "Santobrite" (sodium pentachlorophenate), as a preserving agent, is to be recommended.

When the paper has become dry, it is covered with talcum powder, and, if necessary, the edges are neatly cut. It must be remembered, however, that the paper ceases to be waterproof where it is cut or where the rubber layer has been otherwise damaged. Such places will have to be treated once more with vulcanizing latex (Mixture 1).

Paper prepared in the manner above described has been found to be very satisfactory by those to whom samples had been submitted. It can readily be written on with pencil, though it is not well adapted to ink. On the other hand it takes print very well and can also be used for typing.

The appearance of the paper depends in a large measure upon the even application of the rubber layers. The best method would be to do this mechanically. Highly sized smooth paper is less adapted to being treated than the cheaper kinds of paper. Very good results were obtained with ordinary typewriting paper.

The cost connected with preparing such paper is very small. About 60 g. of rubber are required for a sq.m. of paper; figured according to the prices of latex and vulcanizing ingredients in West Java it will amount to six guilder cents per sq.m., exclusive of the cost of the paper and labor.

Paper Treated with Pliolite

In conclusion we may mention also a second method for waterproofing paper in a way which makes it fit for writing, and with which we have had quite satisfactory results.

Through the mediation of the Goodyear Tire & Rubber Co. we obtained a quantity of Pliolite. Pliolite easily dissolves in benzene, toluene, and numerous other organic substances. Such solutions are very liquid (in contradistinction to solutions of rubber) and spread readily. If paper is soaked in a 6% solution of Pliolite in toluol, a good waterproof paper is obtained. The superfluous solution that has not soaked into the paper must be removed as well as possible to prevent its producing streaks after drying.

The waterproofing is still better if 10% of solidified paraffin is added to the Pliolite.

Paper so treated has almost the same appearance as ordinary paper.

In our experiments we used a milled product in the form of powder which readily dissolved in toluene.

Rubber Cements as General Pastes

Rubber-solvent cements for general pasting work have been found to be valuable where it is desirable to obtain freedom from wrinkles and neatness, cleanliness, flexibility, and the possibility of removal and replacement. Because water swells cellulose fibers, any water-base type of adhesive applied in stripes or spots will wrinkle paper. Although means have been found to reduce wrinkling, elimination has been impossible because the adhesive "sets" before the water content of the paper drops to the point where the fibers tend to shrink or return to their normal position. Thus for paper work it is desirable to use an adhesive with a solvent that will not affect paper fibers.

Para-Lastik, a product of the W. A. Sheaffer Pen Co., was developed specifically as a non-wrinkling adhesive for paper work. It is made from milled rubber and a non-inflammable mixture of carbon tetrachloride and naphtha; it is unvulcanized. The solvent mixture was chosen on the basis of comparisons of volatility, solvent power, inflammability, and toxicity. Specifications covering the grade and condition of the milled rubber include such considerations as color, plasticity, and adhesive power.

In this development it was necessary to make suitable provisions to combat evaporation, the effect of light and various metal contacts, and inertia and viscous flow in order to package at reasonably rapid rates and to insure satisfactory shelf life. In order to protect the non-wrinkle feature, it is necessary that the moisture content be held to a minimum. While a shelf life of at least two years is aimed at, in many instances Para-Lastik has arrived in good condition after five years' storage in trade channels, it is claimed. To protect the adhesive from the effects of light, opaque containers are used. The container is in the form of a collapsible tube with a brush applicator. Improvements in the original tube design include a shoulder on the tube to improve the cap seal and increased wall thickness to prevent distortion in transit or cracking in use.

Para-Lastik is said to stick all kinds of papers, fabrics, transparent wrappers, and other light-weight flexible materials together, to each other, or to any hard surface such as glass, stone, metal, and wood. The cement will wrinkle Pliofilm unless the adhesive is allowed to dry before joining.

A Torsional Hysteresis Test for Rubber[1]

M. Mooney[2] and R. H. Gerke[2]

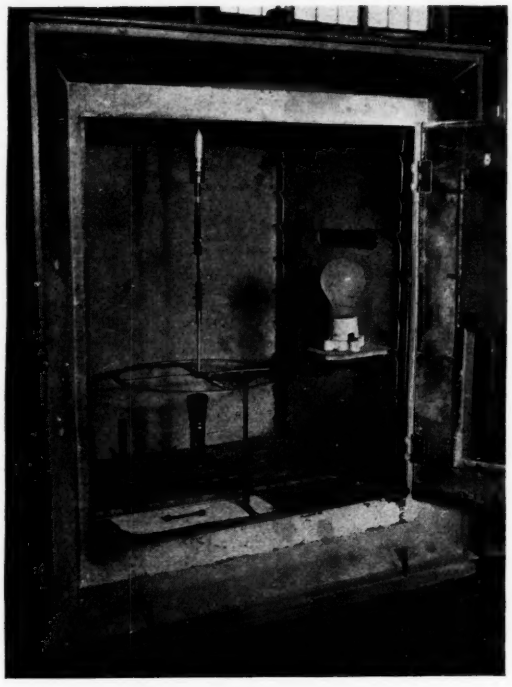


Fig. 1. Torsional Pendulum and Sample

THE mechanical hysteresis of rubber has been measured by almost every conceivable method, many of them simple but inexact. During recent years, however, the practical importance of hysteresis in rubber has been gaining recognition, and consequently there have been developed a number of more elaborate and relatively exact methods and devices for measuring hysteresis. The present article describes a torsional hysteresis test. Although the apparatus required is quite simple, the test is accurate and may be regarded as a satisfactory test for many purposes.

Description of Apparatus

The apparatus consists primarily of a torsional pendulum which is completely supported by the rubber sample which furnishes the restoring torque. For purposes of temperature control, the pendulum is placed inside an oven with a glass door. A photograph of the apparatus is shown in Figure 1. A detailed drawing of the pendulum proper and the clamp by which it is attached to the lower end of the sample is shown in Figure 2. The pendulum circle is cut from sheet aluminum 0.16 centimeter ($\frac{1}{16}$-inch) thick. It consists of a narrow rim, 0.85-centimeter wide, supported on four narrow spokes 0.7-centimeter wide. The total weight of the pendulum, including shaft and clamp, is 52 grams. Its moment of inertia is 3.8×10^3 g cm^2. The circle is graduated in intervals of 5°. Readings are made with respect to the stationary marker visible in front of the pendulum in Figure 1.

The upper clamp of the apparatus is supported on a rod which extends down through the top of the oven. Oscillations of the pendulum are initiated by giving the upper clamp a sudden turn. The hole in the top of the oven is large enough for the sample and the lower clamp to be lifted up through the hole. This arrangement permits changing the sample without opening the oven door, and thus saves time, since uniform temperature is continuously maintained.

The pendulum usually wobbles when it is first let down into the oven. To stop the wobble the support of the upper clamp is pushed down momentarily, to bring the center of the pendulum into contact with the brush mounted immediately beneath it. A spring in the support of the upper clamp permits this vertical movement.

The test piece, detailed in Figure 3, is die-cut from sheet rubber. Standard practice is to use a molded slab, 0.25-centimeter thick, but any rubber sample cut or buffed to approximately 0.25-centimeter ($\frac{1}{10}$-inch) can be used.

Testing Procedure

The dumbbell test piece is first preworked by stretching 20 times to a given over-all length. For gum stocks this stretching length is 15 centimeters (six inches), for tread

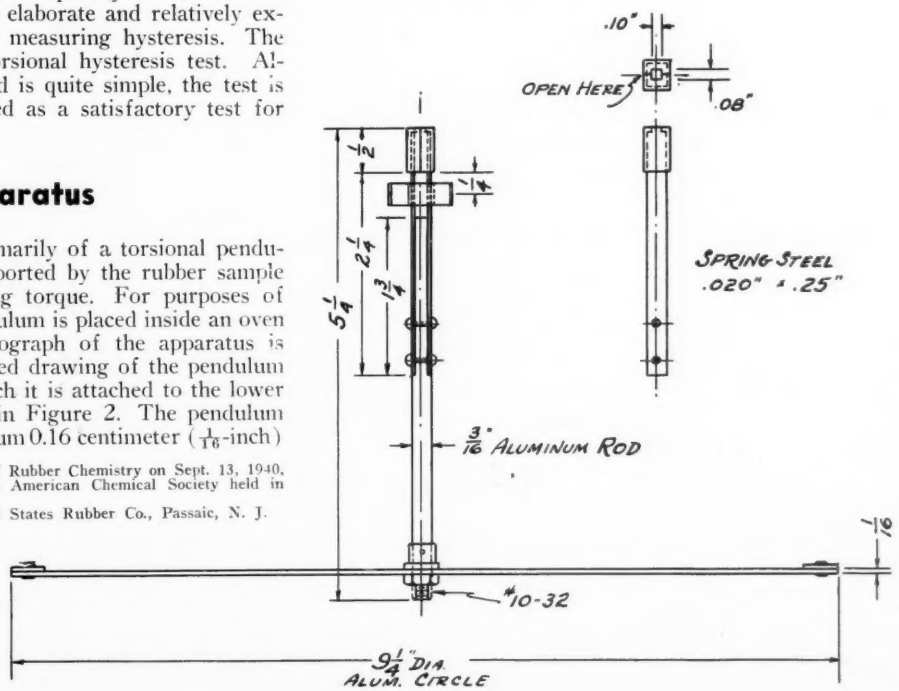


Fig. 2. Details of Pendulum Circle and Clamp

[1] Paper presented before the Division of Rubber Chemistry on Sept. 13, 1940, at the one hundredth meeting of the American Chemical Society held in Detroit, Mich.

[2] General Development Division, United States Rubber Co., Passaic, N. J.

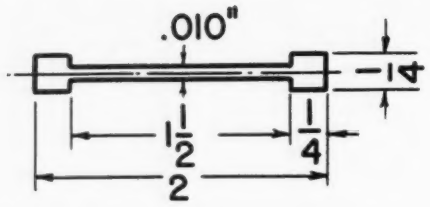


Fig. 3. Dimensions of Die-Cut Test Piece

stocks 10 centimeters (four inches).

The sample is inserted into the clamps of the apparatus, and the pendulum let down into the oven. The wobble is stopped. At one minute after this time the head, or upper clamp of the pendulum, is given a sudden turn of approximately 360°, and the pendulum is allowed to oscillate. (If measurements are made at room temperature, the one-minute waiting period is omitted). At two minutes the head is again turned 360°. At three minutes the head is again turned 360°, and then readings of the deflections at the end of each clockwise and counter-clockwise rotation are made. These readings are usually continued through four complete oscillations.

The method of calculating the logarithmic decrement of the damped oscillation will be illustrated with the following set of typical readings.

TABLE 1. TABLE OF ANGULAR READINGS

Oscillation No.	Clockwise Rotation	Oscillation No.	Counter-Clockwise Rotation
− ½	82°	0	17° (plus 360°)
+ ½	123°	1	341°
1½	154°	2	315°
2½	176°	3	296°
3½	192°		

The calculation is based on the assumed law, found to be approximately valid,

$$\frac{A_n}{A_o} = 10^{-nK} \qquad (1)$$

in which

A_o = amplitude of the zero or initial oscillation.
A_n = amplitude of the nth oscillation.
K = logarithmic decrement to the base 10.

Since an independent observation of the rest position cannot be made conveniently and quickly, the rest position is located by means of the deflection readings themselves. As a satisfactory approximation, the rest position is assumed to lie midway between the deflection in one direction and the average of the preceding and the following deflection in the opposite direction. On this basis, we have in the illustrative example,

$$2A_0 = 377° - ½\,(82° + 123°) = 274.5°,$$
$$2A_3 = 296° - ½\,(176° + 192°) = 112°.$$

Therefore, from Equation (1),

$$K = \frac{1}{3}\log\frac{274.5}{112} = .130. \qquad (2)$$

Energy Calculations

In engineering work it is frequently desirable to know the energy loss per cycle, for purposes of estimating heat development, for example. Let us assume that, at least approximately, E_n, the remaining energy at the end of the nth cycle is given by

$$E_n = GA_n^2/2, \qquad (3)$$

where G is the torsional constant of the system.

From this and Equation (1) it is easily deduced that the relative loss in energy after n cycles of damped oscillation is given by

$$\frac{E_o - E_n}{E_o} = 1 - 10^{-2nK}.$$

If K is sufficiently small, the relative energy loss per cycle of damped oscillation is approximately

$$\frac{\Delta E}{E_o} = 4.6\,K. \qquad (5)$$

In service, rubber is frequently subjected not to damped oscillations, but to forced oscillations of constant amplitude. The exact calculation of energy loss in this case from the value of the logarithmic decrement depends upon the laws of hysteresis; that is to say, on how hysteresis varies with amplitude and frequency. It is often assumed or postulated that mechanical hysteresis of rubber is similar to electrical resistance in an oscillating circuit, or similar to viscous resistance in a mechanical system. However this similarity will not be assumed here, for two reasons: first, because such an assumption does not agree with experimental facts regarding the variation of hysteresis with frequency, and second, because the assumption leads to a very complex relationship between logarithmic decrement and energy loss at fixed amplitude. Such complexity is hardly justified when the assumption leading to it is known to be incorrect.

In our approach to this problem we shall therefore make a simplifying assumption: namely, that in forced oscillation at constant amplitude and constant energy, F, the energy dissipated per quarter-cycle, $D_{¼}$, equals the energy loss per quarter-cycle in a damped oscillation of the same mean squared amplitude, or the same mean energy. Then, from Equation (4),

$$D_{¼} = (1 - 10^{-K/2})\,E_o, \qquad (5)$$

in which E_o is determined by

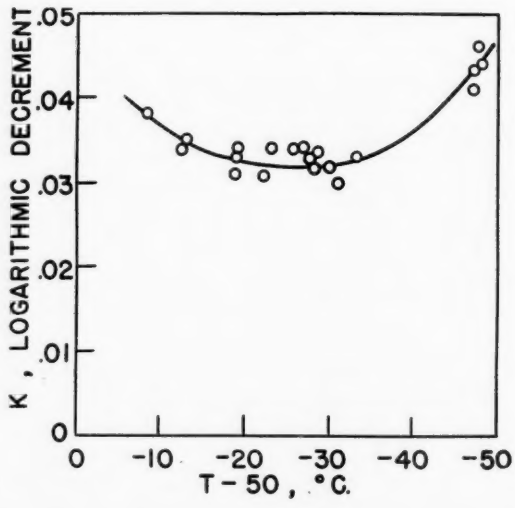


Fig. 4. Torsional Hysteresis as Related to the State of Cure Measured by the T-50 Test

$$(6) \qquad F = \frac{E_o + E_{1/4}}{2} = \frac{E_o}{2}(1 + 10^{-K/2}).$$

From these two equations $D_{1/4}$ can be expressed in terms of F. The energy loss per cycle, D, is $4D_{1/4}$, or

$$(7) \qquad D = 8\frac{1 - 10^{-K/2}}{1 + 10^{-K/2}} F.$$

Measurement of Modulus

Many of the recently developed hysteresis tests include a measurement of the elastic modulus of the stock, usually determined in the form of Young's modulus of a block of rubber under compression. The torsional hysteresis test has so far not been used extensively to measure modulus, although a measurement of the modulus of rigidity is possible and has been made in a few cases. The additional observations required are the period or frequency of the oscillation, and the exact dimensions of the test piece.

The calculation of the modulus of rigidity from these data involves an expression for the torque developed by a twisted rod of rectangular section. The necessary formula has been given by Love.[3] In the torsional test the sample is elongated slightly by the weight of the pendulum. The elongation is, of course, dependent upon the modulus of the stock. In the exact expression for modulus there is consequently a small correction term depending upon the weight of the pendulum. The resulting formula is:

$$(8) \qquad M = \frac{3\pi^2 IL}{4b^4} \cdot \frac{(1+e)^3}{\phi t^2} + \frac{mg}{4b} \cdot \frac{(1+e)}{a},$$

in which

a = cut thickness of the test piece,
b = cut width of the test piece = width of the die,
e = relative set in length produced in the sample, as measured at the end of the test.
g = gravitational acceleration,
I = moment of inertia of the pendulum,

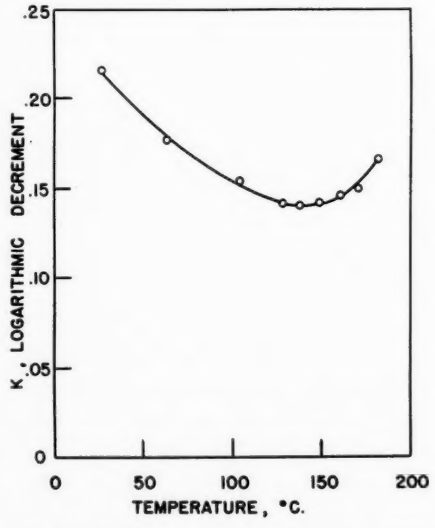


Fig. 5. Torsional Hysteresis as Affected by Temperature of the Test

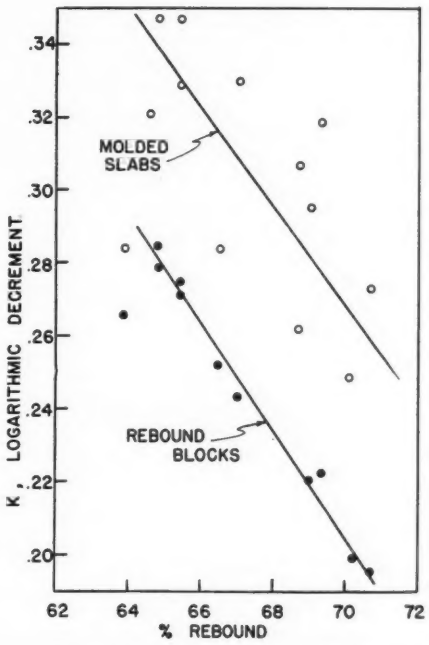


Fig. 6. Correlation between Torsional Hysteresis and Rebound

L = cut length of the test piece,
m = mass of the pendulum,
M = modulus of rigidity of the sample,

$$\phi = \frac{a}{b} - .6274\left[1.0045 - \left(1 - \tanh.\ \frac{\pi a}{2b}\right) - - - -\right],$$

t = period of oscillation.

Values of the shape factor, ϕ, for $a/b = .9$ to 1.1 are given in the following table.

TABLE 2. SHAPE FACTOR

a/b	ϕ
.90	.340
.95	.380
1.00	.422
1.05	.464
1.10	.508

The accuracy of the modulus determination in the torsional hysteresis test is limited by the fact that the die-cut sample does not have strictly straight sides. Highest accuracy would require molding the test piece, as is customary with most other hysteresis tests.

Illustrative Torsional Hysteresis Data

In order to illustrate the general usefulness and precision of the torsional test, some examples of experimental data will be given. Torsional hysteresis as a function of cure, expressed as T-50, is shown in Figure 4. The hysteresis passes through a long, flat minimum. The stocks employed in this test contained from 0.3- to 0.75-part of Captax in the following basic formula. Each compound was given a range of cures.

Smoked Sheet	100
Kadox	2
Laurex	3
Sulphur	3

The variation of torsional hysteresis with the temperature during test is shown in Figure 5, giving the results

[3] Love, "Mathematical Theory of Elasticity," 3rd Ed., Cambridge University Press, p. 328.

obtained with a typical tread stock. Carcass or gum stocks give a curve of closely similar shape, but, of course, lying below the one shown in the figure.

The rebound test for hysteresis has been employed and advanced as a selective test for carbon blacks.[4] Theoretically, the rebound and the torsional hysteresis tests should give very similar results, since in both tests the significant property of the sample is the relative energy loss in a damped cycle. A very close correlation is actually found experimentally between these tests, as is shown in Table 3 and in Figure 6. These samples were typical tread stocks with different channel blacks in the same formula, containing 45 grams of black to 100 grams of rubber.

It will be observed that in order to obtain close correlation between K and per cent. rebound it was necessary to make the torsional hysteresis tests on samples cut from the identical blocks of rubber used in the rebound tests. Torsional hysteresis tests on 0.25-centimeter (0.1-inch) molded slabs from the same raw stocks did not show a close correlation. This comparison is an example of a very general observation regarding carbon black stocks, which is that the variations in hysteresis due to mixing and curing procedures are much greater than the errors in the hysteresis test itself.

TABLE 3. TORSIONAL HYSTERESIS VERSUS PER CENT. REBOUND

Carbon Black	K, Torsional Logarithmic Decrement			Goodyear Rebound* %	
	Rebound Blocks		Molded Slabs		
Black A	.196	.195	.273	70.7	70.7
Black B	.200	.198	.249	69.6	70.7
Black C	.224	.215	.295	69.0	69.0
Black D	.216	.229	.319	69.0	69.6
Black E	.246	.241	.330	66.8	67.3
Black F	.256	.248	.284	66.8	66.2
Black G	.266	.257	.307	68.4	69.0
Black H	.264	.267	.284	63.7	64.1
Black I	.266	.276	.347	65.1	65.7
Black J	.276	.274	.319	65.1	65.7
Black K	.286	.272	.347	64.6	65.1
Black L	.284	.286	.321	65.1	64.6
Statistical Analysis					
s, standard deviation	.0055			.40	
r, range = .285 − .1955 = .0895				70.7 − 63.9 = 6.8	
$r/2s$	8.1			8.5	
Intraclass correlation	.969			.970	

Coefficient of correlation between K (on rebound blocks) and % rebound is −.903.

* For these data we are indebted to W. B. Wiegand of The Columbian Carbon Co.

As regards the ability of the rebound and torsional hysteresis tests to distinguish between different stocks in this series, the results of statistical analysis, given below Table 3, show equality. The ratio of range, r, to twice the standard deviation, s, is the selectivity test employed by Fielding.[4] The intraclass correlation[5] is a more precise measure of the ability of a test to distinguish between samples.

According to Equation (4), we should be able to compute per cent. rebound from torsional hysteresis, and vice versa. In the rebound test the deformation history constitutes only a half cycle. Then by Equation (4) we should have

$$R/100 = 10^{-K} \tag{9}$$

where R is the per cent. rebound. For $K = .20$ we find $R = 63\%$. Figure 6 shows that the agreement with experiment is not very close. Published experimental data on frequency and amplitude effects on hysteresis fail to explain the discrepancy. The explanation seems to be that in the torsional test the law of constant damping factor is not followed strictly by tread stocks, the damping being appreciably smaller during the first half or full cycle than it is in the subsequent cycles. This implies that the rebound test would underestimate the rate of energy loss in a tread stock subjected to continuous oscillation.

As a specific example of compound development with the aid of the torsional hysteresis test, the series of tread stocks[6] in Table 4 may be cited. These stocks, containing increasing amounts of reclaim, have the carbon black adjusted to give the same Shore Durometer. The torsional hysteresis test shows that it was possible to keep the hysteresis at a constant level also. The Durometer, or modulus, being constant, this means that the rate of energy dissipation is the same for all four stocks, whether the cycle is one of fixed strain amplitude or fixed stress amplitude.[7]

TABLE 4. RECLAIM TREAD STOCKS

Smoked Sheet	100	88	76	64
Tire Reclaim, Sp. g. 1.15	0	20	40	60
Carbon Black	45	43	41	38
Pine Tar	3.5	2.9	2.3	1.7
Kadox	5	4.4	3.8	3.2
Laurex	3.5	3.1	2.7	2.2
BLE Powder	1	1	1	1
BJF	1	.73	.62	.51
Sulphur	3	3	3	3
Cure	30 min. at 141° C. (40 lb. steam)			
Shore Durometer	60.5	61.5	61.0	62.0
K at 137.8° C. (280° F.)	.093	.095	.092	.092

Discussion

The advantages of the torsional hysteresis test are obvious from what has preceded. The equipment is simple; the precision is high; and a test piece can be cut from a sample of any shape. The main disadvantage of the test is the limitation on frequency, which must be low enough to permit direct observation of the deflection at the end of each swing. With the apparatus as described, the period is usually from 10 to 20 seconds. However, in spite of this limitation, the test has been found very useful in compound development and in factory control work.

Cry-O-Pak—Frozen Food Pack

Cry-O-Pak is a new container announced by Container Corporation of America, which combines a Cry-O-Vac latex bag (product of Dewey & Almy Chemical Co. and a solid fiber or paperboard case for bulk packing frozen liquids such as fruit juices; semi-liquids, such as cracked eggs and syrup pack fruits; and also bulk solids such as peas, beans, and berries, in units of from 10 to 50 pounds.

The latex bag is held open for filling by stretching it over a fiberboard collar, rectangular in shape. After filling, an air-tight seal is effected by twisting the collar three or four times. This closure is maintained, and the collar prevented from untwisting by its relation to the side walls of the rectangular outer container. After defrosting, the bag is readily untwisted by the consumer, and the opening through the collar again provides a convenient means of unloading the bag.

The Cry-O-Vac bag, tough and flexible at low temperatures, is said to be sufficiently elastic to prevent any danger of bursting as a result of expansion during freezing, thus eliminating the need of the usual head space to allow for expansion and the consequent undesirable presence of air in contact with the foods.

A somewhat different use of the same principle is the OJ container for orange juice and other liquids. After filling, the latex bag is heat sealed to one end of the carton against a round opening in the inner flap. Upon thawing, the perforated outer flap is removed and the latex bag is punctured through the opening for pouring.

[4] Fielding, *Ind. Eng. Chem.*, 29, 880 (1937).
[5] G. W. Snedecor, "Statistical Methods," Collegiate Press, Ames, Iowa, p. 203.
[6] W. S. Coe, private communication.
[7] Cassie, Jones and Naunton, *Trans. Inst. Rubber Ind.*, 14, 340 (1939).

Nomenclature Relating to Rubber

THIS report of the Committee on Nomenclature, Division of Rubber Chemistry, American Chemical Society, was presented before the meeting of the Division at the annual meeting of the Society at Detroit, Mich., September 9-14. The members of the Committee on Nomenclature are Dr. H. L. Trumbull, Dr. H. L. Fisher, Dr. S. D. Gehman, J. McGavack, Dr. A. W. Sloan, and S. Collier. Because of the growing complexity of the materials and terms involved in the activities of the rubber industry, progress in arriving at recommendations and in the adoption into common usage of suitable standardized nomenclature must be the result of careful consideration. Thoughts and suggestions of those in the industry will be helpful in attempting a clarification of the situation. Editor's Note.

The progress in both the science and technology of elastic materials has been so rapid that our knowledge of them has outstripped efforts to provide an adequate vocabulary. Many will agree to the need of a revision and extension of the nomenclature. Fewer may agree to the exact nature of proposed changes. There is a need of more precise definition of terms as well as the invention of new terms. The committee seeks the cooperation of those who are interested and to this end offers a number of suggestions and makes certain proposals.

The needs with respect to words have been well reviewed by T. R. Dawson before the London Rubber Technology Conference.[1] This paper indicates by numerous examples the types of confusion that exist. It does not, however, make specific recommendations for means of clarification.

An important section of the work on terminology is that which relates to synthetic materials which are rubber-like in character. H. L. Fisher has made a valuable contribution with respect to the terminology of these materials in his paper "Nomenclature of Synthetic Rubbers."[2] This, since it is a rational attempt to accept, invent, and define terms, may serve as a guide for the present, even though there may be reasonable disagreement with some of the selections made, and amendments will be necessary from time to time.

The *term* rubber itself has been used to designate so many things as to make it entirely lacking in specificity. The varied meanings associated with the word "rubber" have become so well established that it would probably be fruitless, if not needless, to attempt a reduction in their number.

In the case of synthetic rubber it would be well to avoid such a multiplicity of meanings. No good purpose would be served, however, by trying to limit its use to designate a synthetic material identical with natural rubber, since the latter is such a variable substance. Because the chemistry of these polymeric substances is somewhat obscure and the only chemical property common to all of them is that of high mol. wt., a definition of synthetic rubber can best be made to depend upon the physical properties of the product. Of a number of attempts to define this term, perhaps the best is that of Midgley. He says, "synthetic rubbers are those organic substances which possess the property of forcibly retracting to approximately their original size and shape after being greatly distorted, i.e., such as being stretched x per cent. of their original lengths. —— x —— should be over 100, probably 400, possibly 600, but certainly not higher."[3] It may be suggested, however, that the term "synthetic rubber" should be restricted to the polymers obtained from monomeric organic substances containing conjugated double, or triple bonds, or co-polymers involving these materials.

In the search for names for the ever-increasing list of polymeric substances it is well to attempt their classification, and this can satisfactorily be based upon their chemical composition. The following classification is offered by way of example:

SYNTHETIC POLYMERIC SUBSTANCES

I. Inorganic
II. Organic
  A. Saturated polymers with only carbon atoms in the chain.
    a. Hydrocarbons
    b. Substituted hydrocarbons
      1. Containing halogen (made from vinyl halide).
      2. Containing acid, ester, or nitrile groups.
      3. Co-polymers of 1) and 2).
  B. Unsaturated polymers with only carbon atoms in the chain.
    a. Hydrocarbons (polymers of butadiene and its homologs, and of monomers containing more than one point of unsaturation).
    b. Co-polymers involving butadiene and its homologs.
    c. Halogen containing polymers of butadiene and its homologs.
    d. Alkoxy or Aryloxy containing polymers of butadiene and its homologs.
    e. Acid, ester, or nitrile derivatives of butadiene and its homologs.
    f. Thioplastics.
  C. Polymers in which oxygen, nitrogen, and perhaps sulphur, as well as carbon, enter into the formation of the chain.
    a. Polymeric amides
    b. Polymeric esters
      1. Aliphatic acid esters
      2. Alkyd resins
  D. Derivatives of cellulose.
  E. Derivatives of urea.
  F. Reaction products of phenolic substances with aldehydes.
  G. Derivatives of natural rubber.
    a. Thermoprenes.
    b. Reaction products obtained by the action of stannic chloride, aluminum chloride, etc.
    c. Reaction products with halogen acids.
    d. Reaction products with halogens.

Of course not all of these materials are rubber-like, and many are not the direct concern of the rubber technologist. Nevertheless it is well to recognize their existence in order to avoid including inappropriate examples in the definitions of terms.

In some cases the rubber-like properties of elasticity and plasticity are engendered in the materials, in other

[1] "On Rubber Terminology," paper No. 42, "Proceedings of the Rubber Technology Conference, 1938," edited by Dawson and Scott, W. Heffer & Sons, Ltd., Cambridge, England, p. 1003.
[2] *Ind. Eng. Chem.*, 31, 1941 (1939).
[3] "Chemistry and Technology of Rubber," edited by Davis and Blake, Reinhold Publ. Co., New York, N. Y., p. 679 (1937).

cases merely enhanced by the incorporation of high boiling liquids called "plasticizers." These have also been referred to as "elasticizers," or "elasticators," or even "softeners."

Natural rubber has two outstanding characteristics, its unusual elasticity and its vulcanizability. Synthetic rubber-like polymers possess these characteristics in varying degree, and the former characteristic has been made a part of the definition of synthetic rubber. The latter should be used as a basis for classification or differentiation.

Thus arises the necessity of defining vulcanization. Thus far in the literature vulcanization has been defined with reference to natural rubber although it is now used in connection with synthetic rubber. It has been used to identify the process of forming both soft rubber vulcanizates and ebonite. This is unfortunate, and while usage sanctions this multiple service of the term with respect to natural rubber, it would be well to confine the term vulcanization, with respect to synthetic polymers, to the process which forms products with an elasticity akin to that of soft rubber vulcanizates, and to select a new term to refer to the formation of hard polymers resembling ebonite. Such a word might be "ebonation" (verb: ebonize; noun: ebonizate or ebonate).

Definitions of vulcanization have formerly emphasized the chemical process involved, e.g., E. B. Babcock says: "Vulcanization as ordinarily conceived can be defined as the process of combining sulphur with rubber under the influence of heat."[4] He notes, however, that the recent definitions stress not the chemistry involved, but the physical changes which take place.

E. Kindscher says: "The process of vulcanization then transforms the rubber from the plastic into the elastic condition so essential for practical use."[5]

Dawson and Porritt say: "Vulcanization is any process which converts raw rubber into a product insoluble in most solvents, less sensitive to temperature changes, and of increased elastic and less plastic properties."[6]

Ira Williams says: "Vulcanization is essentially a process which reduces the plastic properties of the rubber, and is accompanied by an increased resistance to solvents and an increased resistance to hardening at low temperatures."[7] In another place he says: "In the broadest sense vulcanization to produce soft vulcanized rubber is any treatment which maintains the elasticity of the rubber while its plasticity is decreased."[8]

What then is to be the definition of vulcanization as it refers to synthetic materials? Upon questioning a number of specialists in the field of synthetic polymers, there was found to be a unanimity of opinion that plasticized polyvinyl chloride, "Thiokol," and polyisobutylene are not vulcanizable, although at least the first two can be made to undergo some partial decrease in thermoplasticity by a heat treatment in the presence of proper catalysts. If the definition of vulcanization excludes these changes, or worse, does not make any disposition of them, then an author will resort to the very unfortunate expression "so-called vulcanization." It will probably be necessary, therefore, to have a word, or words to represent more accurately this apologetic expression.

It would be helpful to an understanding of the literature if every author carefully indicated whether he was referring to the unvulcanized or the vulcanized forms of polymers under consideration. This could be done very simply, by using the accepted name of the polymer for the unvulcanized form, and prefacing the name with v. for the vulcanized form.

It should be emphasized that all monomers should have different names from their corresponding polymers. This is in general the case, for where only one monomer is involved in the polymerization, the polymer has the same name prefaced by "poly," e.g., isoprene, chloroprene, bromoprene, phenoprene, alkoxyprene. The polymer may also be given a distinctive trade name, e.g., neoprene. Those polymers above, having the "prene" ending, are included in the generic term polyprenes. The "prene" ending has been used to designate the analogs of isoprene, and the materials indicated are monomers unless the word is prefaced by poly—, except for the term thermoprenes. The latter refers to a quite different variety of materials, presumably cyclicized derivatives of natural rubber and is so well established through long usage that it must be accepted.

With respect to other generic terms, there is no need of the multiplicity of words such as thioplastics, thioplasts, and thiomers. The first one should be sufficient and sufficiently characteristic unless one should prefer to emphasize the most outstanding characteristic of these materials and call them thiodors.

Just as the adjective synthetic has now become also a noun, so has the adjective elastic become a noun, and we have a generic class called elastics. So have we also a class of plastics. There seems no need, however, for the elided word lastics, or the extended word elastoplasts.[8]

We have had for some time the words monomer and polymer. Now we have the words co-monomer and co-polymer. The meaning of the latter is easily evident, but one may wish to know what meaning can be ascribed to the former. The two words do not have parallel meanings, the co-monomer referring to that unit entering into the formation of the co-polymer which is added to vary the properties of the polymer obtained in its absence, acrylic nitrile, for example, being the co-monomer when added to butadiene.

Although many hyphenated words lose their hyphens in the course of time, it would be well to retain the hyphens in co-monomer and co-polymer until the words have become more familiar through longer use. The hyphen certainly aids laymen to correct pronunciation.

We have the words plasticize, plasticizer, and plasticization. Why not also plasticate, plasticator, and plastication? One hears these latter terms, e.g., "Gordon plasticator," but looks for them in vain in dictionaries and in glossaries of technical terms. They perhaps are an unnecessary duplication, except that plastication is easier to say than plasticization. What then of plastify, rhyming with mystify, and plastifier, and plastification?

How does plastification differ in meaning from mastication? It would perhaps be well to limit the term mastication to the process of working rubber or synthetic rubbers on open mills or calenders, and plasticization to the process involving essentially heat (with or without mixing) or a combination of heat and a chemical activator for the softening process. A plasticator, as mentioned above, can be the name of a machine for plasticizing rubber, but it would be confusing to name the chemical aid to plasticization a plasticizing agent, for the latter expression has been used to represent softeners added to rubber or synthetic rubber to increase the plasticity or to vinyl compounds to change horny modifications, by a swelling action, into gels that are more or less rubber-like. The chemical aids to plasticization have been called "mastication accelerators."

(*Continued on page* 38)

[4] *Ind. Eng. Chem.*, 31, 1198 (1939).
[5] "The Science of Rubber," edited by Memmler, Amer. Ed., Reinhold Publishing Co., p. 270 (1934).
[6] "Rubber, Physical and Chemical Properties," edited by Dawson and Porritt, The Research Association of British Rubber Manufacturers, Croydon, England, p. 603 (1935).
[7] "Polymerization, edited by Burk Thompson, Weith, and Williams, Reinhold Publishing Co., p. 167 (1937).
[8] "Chemistry and Technology of Rubber," p. 237.

Safety Features on Mills and Calenders for Rubber and Plastics[1]

J. Milward[2]

THE materials used in the manufacture of rubber and plastic articles are mixtures of basic crude materials and various other ingredients. In the rubber industry these basic materials are natural rubber or synthetic rubber[3] and in the plastic industry they are the various plastic polymers. The ingredients added to these crude materials are necessary to proper processing or are necessary to produce the desired result from heat treatment or are added as inert fillers or reenforcing agents. The mixing is accomplished while the crude material is in a plastic state. Although large internal mixers of various types are used for heavy production, the equipment used in the greatest number for the purpose consists of a pair of iron rolls geared together and turning toward each other. Furthermore the equipment is usually hand fed. It is heavy equipment, and its operation is accompanied by the pronounced hazard suggested by Figure 1. Calenders, which are used for frictioning and sheeting, as well as other specialized roll equipment[4] present a similar hazard.

The plastic milling of materials requires tremendous power, and there is an ever-present danger that a careless operator may be caught accidentally while handling the material on the machine. Inasmuch as the equipment is unique to the rubber and plastic industries, the design of safety equipment is also unique to this class of machinery. This safety problem has three important phases, which follow.

The first of these is the design of power cut-out and adequate braking systems in order to stop the equipment quickly and without damage. The second is a suitable arrangement of tripping devices located to permit almost

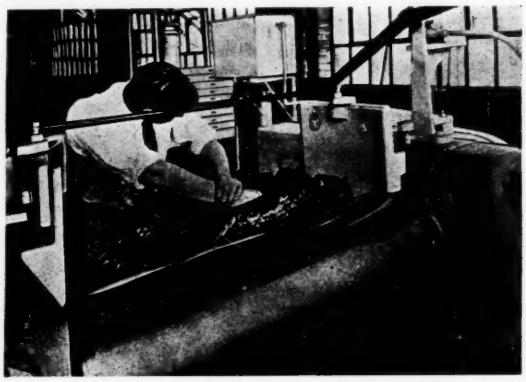


Fig. 1. Possible Mill Accident

While improperly cutting material too close to the bite of the rolls, the operator's knife and hand may get caught in the material. He may use his free hand in trying to free the other and at the same time operate the safety bar with his head

[1] Presented at the Safety Session under joint auspices of the Standing Committee on Safety and the Process Industries Division, American Society of Mechanical Engineers, held December 4, at Hotel Astor, New York, N. Y.
[2] Sales engineer, Wm. R. Thropp & Sons Co., Trenton, N. J.
[3] Synthetic rubber is really a misnomer for rubber-like materials which have some of the properties of rubber. Usage has apparently established the term, however inexact, as a designation for a growing variety of new materials.
[4] "Rubber Machinery," by Henry C. Pearson, published by INDIA RUBBER WORLD, New York, 1920.

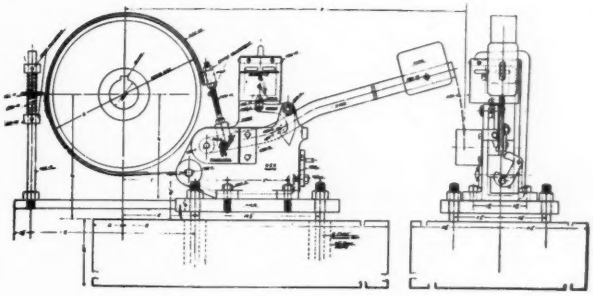


Fig. 2. Diagram Showing Essential Parts of a Mechanical Brake Electrically Held

involuntary operation by an operator in distress. The third phase of this problem is largely a question of an employer's responsibility to his operator to install and maintain the best available safety equipment.

Design of Braking Systems

The first rubber mills had no power cut-out, no brakes, and no method of stopping except the use of an obstruction thrown into the bite of the rolls. This has frequently been referred to as a "crowbar" brake. Although the method often would stop a mill, the operator did not always have within his reach a suitable implement to throw into the bite of the rolls. When such an implement was found, the inevitable result was severe damage to the rolls or frame of the mill. After stoppage of the mill was accomplished, however, it was not certain that fracture of one of the rolls would not permit rotation of the portion of the broken roll on the gear end. This was an inadequate method of braking from several obvious points of view.

The first important advance toward safer operating conditions was the introduction of a throw-out clutch on the high-speed drive shaft. Then even after the clutch was disconnected, the rolls might be carried through several revolutions by momentum. As mechanical drives from line shafts gave way to electric motors, the mechanical throw-out became unnecessary, but brakes were still lacking.

Today both mechanical and electrical brakes are available. Both classes operate on the high speed drive shaft and utilize the mechanical advantage of the chain of reducing gears to obtain quick stopping action. The strictly mechanical type of brake employs a weight actuated lever, as shown in Figure 2, to supply the brake. Normally the lever is in the elevated position, but when the release mechanism is operated, the power to the electric drive is cut off and the brake lever is released. This brake is electrically held by a solenoid and likewise it is applied by breaking the current through a solenoid. Mechanically held brakes are also used and these employ a system of

levers terminating in a hook so as to apply the brake simultaneously with the switching off of the power to the motor. In either case the motor cannot be started again without resetting the brake by hand. The electrically held brake has the advantage of remote control. It is better suited to a multiple mill installation driven by a single motor. As shown in Figure 2, a catch is provided to lock the brake as soon as it is once applied.

A frequent variation of the mechanical brake employs a brake drum and band just as in the strictly mechanical type, but the braking force is applied magnetically by means of an armature and solenoid. Mechanically actuated brakes, whether electrically or mechanically held, provide rapid and positive stoppage of mills without injury to their drives or rolls. They are simple and reliable in operation and low in first cost and are used in the majority of installations for these reasons. Electrical braking on mills and calenders is relatively new. The three major groups in the electrical class are known as dynamic braking, regenerative braking, and plugging.

Both dynamic and regenerative braking require that the mill drive be either a synchronous motor or a direct current motor. This requirement might often necessitate a compromise with the type of motor drive that might otherwise be chosen for the service. Dynamic braking is rapid in the early stages, but an intrinsic fault of the method is that its effectiveness drops off as the speed decreases. It involves a succession of changes in electrical connections by heavy contractors and the use of relays to give a full electric field for effective braking. The equipment is expensive and requires specialized maintenance skill to assure reliable operation. Regenerative braking has the advantage of maintaining full braking power at all speeds and does not involve the opening and closing of heavy contacts. This method is applied chiefly on calender drives employing direct current adjustable voltage to obtain variable speed, but it is high in first cost.

The third group, employing plugging, is applied to polyphase induction motor drives. This consists of changing the electrical connections to reverse the motor while running at full speed. It requires the use of control equipment, including relays to disconnect the motor as it approaches a dead stop. This method is not approved by the safety inspection groups of some of the states for the machinery which is used in the rubber and plastics industries.

Arrangement of Tripping Mechanisms

The second phase of the safety problem involves the proper arrangement of tripping mechanisms and has received a great deal of study by competent safety and design engineers. Two arrangements are shown on the calender in Figure 3. The first is a safety bar which is usually adjustable in height. This can be operated by the head or free arm of the operator and should be placed at about shoulder level to be readily accessible and most effective. The other arrangement is a safety cable at both sides of the calender in such a position that it can be operated either by a free arm or by foot. In some cases other devices that can be operated by the foot have been provided.

It has also been proposed that mills be equipped with photo-electric cells with a beam of light passing from one side of the mill to the opposite side where it is focused on the photo-electric cell. Any opaque object that assumes a position so as to cut off the beam will actuate the brake mechanism and stop the mill. This form of tripping mechanism could be relied upon as definitely as any, but it is considered impractical and inconvenient because of accidental stoppages while materials are being added to the mix on the mill or at times during the ordinary manipulation of the batch on the rolls.

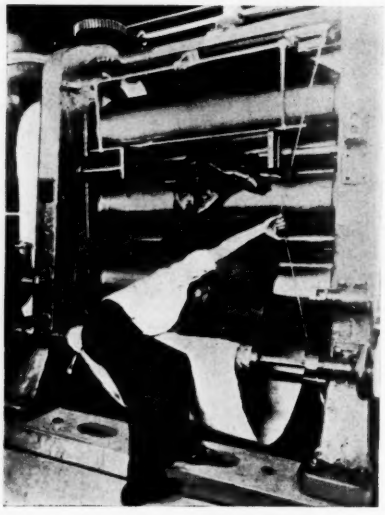


Fig. 3. Tripping Mechanisms on Calender

While starting a calender and feeding frictioned fabric on the take-up, if the operator's left arm becomes caught, he may stop the calender by pulling the safety cable

Responsibility for Safety Conditions

The third phase of this problem is perhaps the most important one at the present time. It involves the obligation of employers to provide the equipment and conditions necessary for a reasonable degree of safety to their operators in the milling and calendering of rubber and plastics. Unfortunately it is still necessary to force some employers to install safety devices. It is also unfortunate that safety devices are not always properly maintained in effectiveness. Rigid and periodic inspection of installed safety equipment should be the practice in every room where machinery is in motion. Much remains to be accomplished in the adoption of safety codes by the various states, although precedents have been established.[5] Essential features of such codes are specifications governing the location of tripping bars and cables, and the statement of maximum roll surface travel for a given mill after the safety brake is applied.

Processing of rubber and plastics is definitely hazardous. A number of the states have no safety code for their industries. It is not possible or necessary in this brief paper to go into all of the details of brake design and installation for rubber mills. Many of these have been covered elsewhere.[6] However it is appropriate that this opportunity be taken to emphasize the importance of installing and maintaining safety equipment. Huge sums of money have been spent by conscientious employers and producers of equipment to achieve the present degree of safety, but constant vigilance is the price for the continuance of safety progress.

[5] "Safety Code for Rubber Mills and Calenders," Bulletin No. 447 of the United States Bureau of Labor Statistics, United States Government Printing Office, June, 1927. "Tentative Safety Code for Mills and Calenders," State of New Jersey, Department of Labor, Bureau of Electrical Equipment C. George Krueger, Deputy Commissioner, November 1, 1939.

[6] "Safety First and Efficiency," Joseph W. Thropp, INDIA RUBBER WORLD, November, 1923.

Distributers' Tire Stocks in the United States, October 1, 1940[1]

E. G. Holt[2]

THE results of the fifteenth quarterly survey of retail stocks of automobile tires and inner tubes, as of October 1, 1940, are shown below in comparison with summary data for preceding quarterly surveys. The bases and methods described in earlier reports have been used in calculating the stocks held by the following three groups of distributers:

1. Individual dealers, including large and small retailers.
2. Distributers through oil-company chains.
3. Manufacturer-owned-and-operated stores, mail-order houses, and other important retail chains.

Distributers' Stocks Indicated by Surveys

Total distributers' stocks of motor-vehicle casings were estimated at 7,270,000 on October 1, 1940, a reduction of 789,000 during the third quarter, but 411,000 above October 1, 1939. A considerable decline in stocks during the third quarter is seasonally normal, and while the current reduction is unusually large, the July 1 total stocks were abnormally high; therefore the reduction leaves stocks in more even balance.

While a third-quarter reduction was common for all three groups of distributers, it occurred chiefly in the stocks of chain-store groups. Each group was holding larger stocks October 1, 1940, than a year earlier.

	Thousands of Casings			
	Dealers	Oil Companies	Other	Total
1940				
October 1	3,139	1,790	2,341	7,270
July 1	3,281	1,796	2,982R	8,059R
April 1	3,312	1,755	2,482	7,549
January 1	2,996	2,000	2,014	7,010
1939				
October 1	3,122	1,487	2,250	6,859
July 1	2,900	1,646	2,356	6,902
April 1	3,018	1,725	2,074	6,817
January 1	2,735	1,838	1,920	6,493
1938				
October 1	2,588	1,840	1,990	6,418
July 1	2,767	2,079	2,163	7,009
April 1	3,007	1,869	2,051	6,927
January 1	3,015	2,115	1,920	7,050
1937				
October 1	3,000	1,774	2,289	7,063
July 1	3,363	1,996	2,299	7,658
April 1	3,835	1,853	2,304	7,992
1936				
Estimated	3,500	1,650	2,000	7,150

R—Revised.

The total distributers' inventory of inner tubes was also reduced during the third quarter, this reduction occurring in the holdings of individual dealers and mass distributers, the oil companies reporting somewhat higher inventories than on July 1. Aggregate stocks of inner tubes were lower than on October 1, 1939. The effect of group tube sizes is to reduce the tube stocks needed by distributers to service customers.

	Thousands of Inner Tubes			
	Dealers	Oil Companies	Other	Total
1940				
October 1	3,029	1,501	1,754	6,284
July 1	3,486	1,446	1,799R	6,731R
April 1	3,551	1,487	1,821	6,859
January 1	3,310	1,671	1,532	6,513
1939				
October 1	3,220	1,406	1,793	6,419
July 1	3,206	1,393	1,829	6,428
April 1	3,460	1,626	1,588	6,674
January 1	3,445	1,733	1,599	6,777
1938				
October 1	3,132	1,781	1,727	6,640
July 1	3,560	1,805	1,786	7,151
April 1	4,021	1,918	1,728	7,667
January 1	3,547	2,127	1,717	7,391

R—Revised.

Dealers' Reported Stocks

Stocks reported by 1,350 individual dealers for 2,154 stores in the current survey are compared below with the inventory of the same firms July 1, 1940. Smaller stocks of both casings and inner tubes are reported by each of the three size groups of dealers.

	Number of		July 1, 1940		October 1, 1940	
Casings	Dealers	Stores	Casings	Tubes	Casings	Tubes
Under 200	901	1,043	83,004	102,443	74,615	95,999
200 - 500	267	517	89,814	96,266	84,493	84,709
Over 500	182	594	236,666	206,023	232,603	199,097
	1,350	2,154	409,484	404,732	391,711	379,805
Other October	352	507	....	....	116,591	112,706
Total October	1,702	2,661	....	....	508,302	490,511
Index numbers	....	....	93.8	....	89.7	86.6

Stocks of Special Dealer Groups

Stocks reported by 102 New York dealers with 141 stores in the current survey amount to 31,030 casings and 24,660 tubes, returns comparable with July 1 indicating reductions during the quarter. Reports from dealers handling tires of particular make were also compiled in three instances, and these reports likewise showed reduction in stocks of both casings and tubes during the quarter except that for one make an increase in casings stocks was found. The preceding table includes data mentioned in this paragraph.

Oil Company Distributers' Stocks

Comparative returns were received from 37 firms in this group, a total of 39 reporting in this survey. Some reports covered stocks in central warehouses only, while others also covered stocks in about 17,000 retail outlets. The stocks of casings declined negligibly, while stocks of inner tubes increased for the group, but there appears to have been no marked inventory change from the second quarter.

Oil Company Reported Stocks

	July 1	October 1	
	Comparative	Comparative	Other
Number of firms	37	37	2
Casings	997,489	994,887	16,471
Tubes	792,680	833,537	14,922
Index Numbers			
Casings	108.9	108.5	.....
Tubes	87.6	91.0	.....

[1] Reprinted from *Part 10—Rubber and Its Products* of Industrial Reference Service, prepared by Leather and Rubber Division, U. S. Department of Commerce, Washington, D. C.

[2] Chief, Leather and Rubber Division.

Other Mass Distributers' Reported Stocks

Reports were received from six tire manufacturers operating 2,096 retail stores and covering 977,549 casings and 708,752 tubes held in those outlets, and from eight other mass distributers operating 1,968 retail stores (and/or doing mail order business) and covering their total stocks. The manufacturers' stores were holding somewhat lower stocks of both casings and tubes than on July 1. The other firms in this group report sharply reduced aggregate stocks of casings but practically no change in tube stocks. The percentage change in total stocks during the quarter, indicated by *comparable* reports, is carried into totals shown in the summary tables, where July 1 totals also have been revised.

MASS DISTRIBUTERS' REPORTED STOCKS

	July 1	October 1
Number of firms	15	14
Number of stores	4,160	4,064
Casings	2,982,099	2,328,686
Tubes	1,798,542	1,741,195

NOTE.—Indicated percentage change during quarter: Casings—21.7; Tubes —2.5.

Stocks of tire manufacturers included above are also included in manufacturers' stocks as reported by the Rubber Manufacturers' Association.

Acknowledgment

The support of The Rubber Manufacturers' Association, Inc., the assistance of the National Association of Independent Tire Dealers; and the cooperation and promptness of dealers, oil-company distributers, manufacturers, and other mass distributers in submitting data used in this report are gratefully acknowledged. We especially thank all dealers who have submitted data and urge them to report regularly in future, as regularity is essential to trustworthy estimates of total dealers' stocks. The survey is open to participation by any tire dealer, and we shall be glad to hear from dealers desiring to furnish data in order to receive our summary reports.

Precautions against Freezing of Latex in Transit and Storage

Information received from the Naugatuck Chemical Division of United States Rubber Co., 1230 Sixth Ave., New York, N. Y., points out that it is necessary to take precautions during cold weather to prevent the freezing of liquid latex, latex compounds, and artificial aqueous dispersions of crude, reclaimed, and synthetic rubbers or their compounds during both transit and storage. Since these materials are water emulsions of rubber and rubber compounds, they will freeze at or near the temperatures that freeze water. This freezing sometimes breaks the emulsion and makes the latex or artificial dispersion of rubber unsuitable for use.

Since all carriers, railroads, carloading services, and trucking concerns with the one exception of the Railway Express Agency, disclaim responsibility for material frozen in transit, precautions must be taken to insure protection of the material from freezing. With the exceptionally good care taken by suppliers up to the time of delivery to the carrier, there is little or no possibility of the latex or artificial dispersion of rubber being frozen before shipment.

As a guide to the care of material after it leaves the supplier's plant, Naugatuck's experience with the various means of transportation is outlined below:

Via Railroad. Carload shipments are made in dry refrigerator cars, and heater service can be provided for at an additional charge. If the supplier warms the car and material prior to loading, the cooling time is correspondingly lengthened. This precaution and the installation of heaters offer reasonable protection against freezing. Less carload lots are more difficult to protect as the railroads do not supply dry refrigerator service unless the shipment is 15,000 pounds gross or over. However, in the case of shipments of 15,000 pounds gross, heated dry refrigerator car service can be obtained, with the shipment still being considered as l.c.l.

Via Truck. No difficulty with freezing on short hauls by truck has been experienced, but long hauls by truck are not recommended during cold weather. At present heated truck service can be obtained for hauls from the metropolitan New York area to St. Louis and Chicago vicinities on shipments of 5,000 pounds gross or over.

Via Parcel Post. The Post Office does not assume any responsibility for freezing, or can claim be made against the Post Office for material destroyed by freezing, even if the shipment is insured. It takes reasonable precautions to protect the material from freezing if so marked, but no guarantee is given.

Via Express. The carrier assumes responsibility to protect the material from freezing when properly marked. However express shipment usually costs more than shipment by other carriers.

Very definite precautions also should be taken to safeguard the material after the carrier delivers it. It should not be exposed in the consumer's shipping or storage sheds or departments for any length of time. Furthermore it is suggested that consumers anticipate at least some of their requirements and have delivered, prior to severe weather, sufficient material to eliminate the risk of shipment during extremely cold weather.

Should the latex or dispersion become frozen, it is often possible to bring it back to a usable condition by thawing gradually. No direct application of heat should be made, but the frozen material should be allowed to stand at normal room temperature or at moderately elevated temperatures until completely thawed.

From the foregoing it is apparent that for shipments other than by express, sufficient time must be allowed to provide for the available precautions for protection against freezing during transit. However, for shipments via less carload rail, truck, or parcel post there will be considerable risk involved.

Nomenclature

(*Continued from page* 34)

There are other problems of nomenclature which need clarification, and these should be considered by the committee at a later time. The present report summarizes the more pressing problems, suggests some remedies to avoid confusion, and indicates the need of both elaboration and simplification of terminology which it is hoped may encourage others to express themselves in ways that will be philologically useful.

H. L. TRUMBULL
A. W. SLOAN

Rubber Springs under Compression Loading[1]

J. F. Downie Smith[2]

IT IS common practice when using rubber pads in shear to subject the rubber to compression simultaneously. The value of the compression is ordinarily from 5 to 10% of the free thickness of the rubber, and before shear stress is applied it is customary to have a shape something like that shown in Figure 1. Depending upon conditions, the angle θ would vary with the shear load. A question which might arise in the designer's mind is: "With varying angles of θ, what would be the effect on the compression load-deflection curve?" This can be investigated in several different manners. One would be to vary the angle θ, always maintaining the same length, width, and height of the piece. It is clear that with one length, one width, and one height of the rubber, a piece with the angle θ greater than zero would give greater deflection under a compression load of a certain amount than a rectangular block with the same dimensions. In the experiment performed here, this particular method was not adopted merely because it was inconvenient. The system used was to maintain a constant width and height, starting with a rectangular block of a definite length. From this block duplicate wedge-shaped sections were cut from each end, thus decreasing the length and the load-deflection curve was again obtained. The experiment was repeated for several different angles of θ up to 30 degrees. After the block with this angle removed had been tested, the angle was decreased by cutting wedges in the reverse manner from the piece until the angle was reduced to zero. The second set of curves obtained with various angles is shown in Figure 2.

Several interesting facts were obtained during these tests. Among the most important are the following:

(1) Looking at Figures 1 and 2 it can be seen that at a stress of 100 psi and angle zero, the deflection with the initial block was 28%, whereas with the final block, which was a little more than one quarter the original length, the deflection was 29%. Thus the influence of length over this range was not great. Such close agreement is not obtained with angles of θ greater than zero. For example, with θ = 20 degrees and stress of 60 psi, the deflection with the larger block is about 21.5%, whereas with the smaller one it is about 25%.

(2) A second important point involves the first statement that no great change in deflection based on a definite compressive stress applied to the plates takes place over a wide range in length. From Figure 1 it can be seen that a shear pad, starting with an angle θ = 30 degrees and a

[1] Presented before the subdivision on Rubber and Plastics of the Process Industries Division, American Society of Mechanical Engineers, at the annual meeting, New York, N. Y., Dec. 2-6, 1940.

[2] United Shoe Machinery Corp., Beverly, Mass., formerly with Edw. G. Budd Mfg. Co., Philadelphia, Pa.

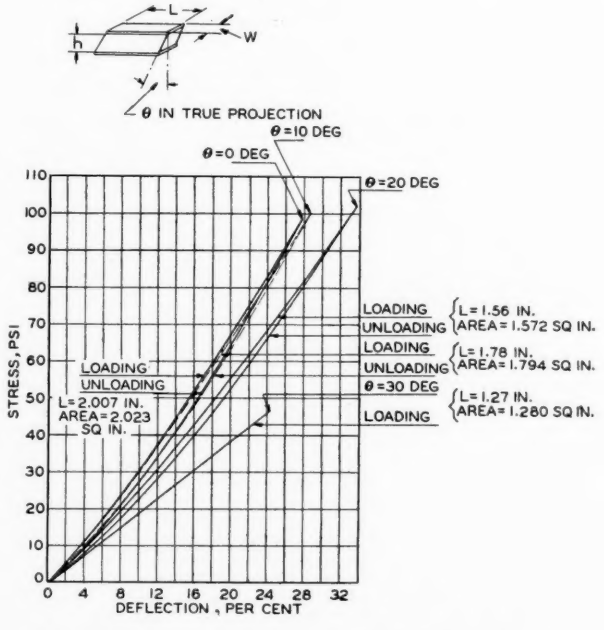


Fig. 1. Compression Loading of Rectangular Rubber Slab with Angle θ Increasing from Zero to 30 Degrees
(W = 1.008 in. and h = 1,031 in. in all cases. 36 durometer hardness.)

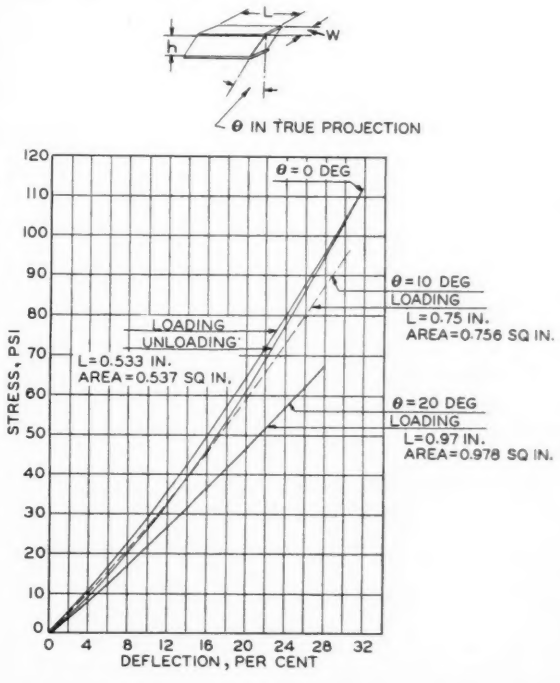


Fig. 2. Compression Loading of Rectangular Rubber Slab with Angle θ Decreasing from 30 Degrees to Zero
(W = 1.008 in. and h = 1,031 in. in all cases. 36 durometer hardness.)

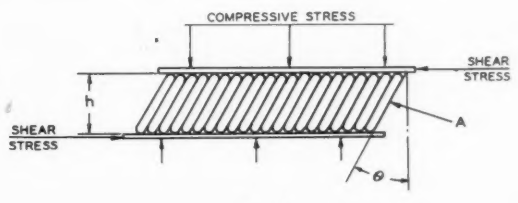


Fig. 3

compression of 20% would have a lateral compressive force of 38 psi. When this pad is loaded in shear, however, until the angle $\theta = 0$ degree for the same compressive defiection the compressive stress is now 67 psi, or an increase 76% over that originally applied. For still larger initial angles of θ than 30 degrees (and 45 degrees is common in industry) it would be expected that still greater compressive stresses would be encountered. This naturally is of importance when designing the housings for the shear pads.

The author realizes that this conclusion is based on indirect readings and that verification by direct measurement would be desirable. Such measurements would involve the determination of compressive stresses as shear loads are increased from 0 to maximum.

A possible explanation of this phenomenon can be obtained from Figure 3. For this argument we can consider that the rubber consists of an infinite number of rubber columns, each one alike and all parallel to column A. As the angle θ is decreased with constant height h, the length of each element A decreases, so that the compressive force necessary to maintain h is increased.

In contrast to this effect we have the following rather well-known result: If a double shear pad is loaded centrally with small initial lateral compression (see Figure 4), then under full load the slabs tend to leave the supporting walls at the top, indicating a decrease in compressive force at this point as the shear stress increases. This can be understood from Figure 4. As the angle θ decreases diagonal A decreases in length, thus creating compression at X, but diagonal B increases in length, causing tension at Y. If the previous conclusion regarding the increase in compressive stress is correct, it must be that the increase in compression at the bottom of the shear pads is much greater than would be expected at first glance. Further experimentation on this particular subject might yield interesting results.

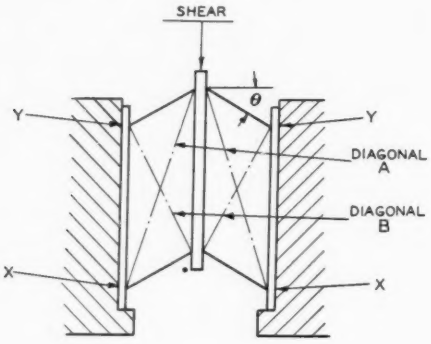


Fig. 4

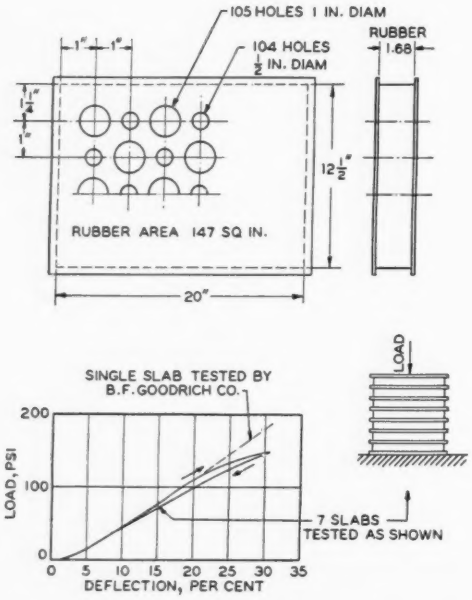


Fig. 5. Compression Loading, B. F. Goodrich Rubber, 38 Durometer, Compound 9250

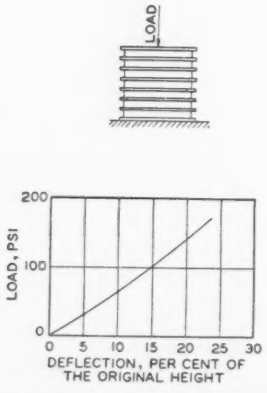


Fig. 6. Compression Loading of a Set of Seven Rubber Slabs, B. F. Goodrich Rubber, 38 Durometer, Compound 9250
(Dimensions, 20 X 12½ X 1.68 in.; 105 holes 1-in. diam.; 104 holes ½-in. diam.; four ⅝-in. diam. guide pins to prevent buckling of the slabs.)

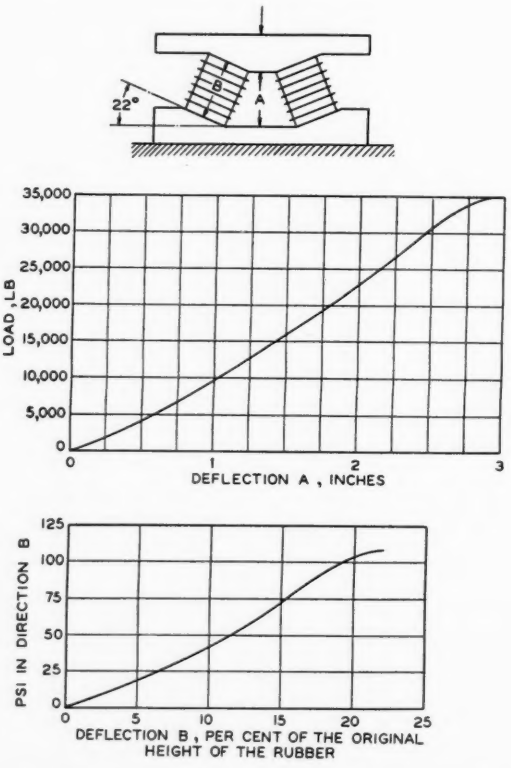


Fig. 7. Compression Loading of a Set of 14 Rubber Slabs, B. F. Goodrich Rubber, 38 Durometer, Compound 9250
(Dimensions, 20 X 12½ X 1.68 in.; 105 holes 1-in. diam.; 104 holes ½-in. diam. in each slab.)

(3) The effect of increasing angles θ on the compressive stress-strain curves is not linear. Small angles play little part; whereas larger angles have more effect than would be obtained from direct proportion to the smaller angles.

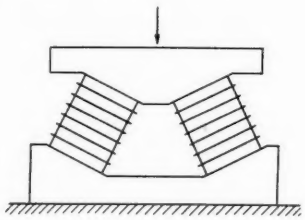
(4) If the effective area is considered to be $W(L - h \tan \theta)$, then the curves all come much closer together, showing that the end piece of length $h \tan \theta$ plays little part in the resistance to compression.

Rectangular Pads with Holes

It is common commercial practice, where compression pads are to be used for relatively large deflections, to have the pads perforated. Such a pad is shown in Figure 5. A single slab of this construction was tested in the laboratories of The B. F. Goodrich Co. and the curve obtained experimentally is dashed in Figure 5. Upon receiving those slabs, seven were mounted in series in the laboratories of the Edw. G. Budd Mfg. Co., and the load-deflection curve again obtained. It will be seen from Figure 5 that up to about 20% deflection, the curve for the single slab agrees with that for the seven slabs. This, of course, is to be expected. Upon still further increase in load, however, the deflection of the seven increased more rapidly than did the single one. The reason for this increase was found during test and can be definitely given as instability. To check this conclusion the same slabs were mounted with four guide pins to prevent side movement of any slab, and curves again obtained. Figure 6 shows that the instability was not evident even up to 24% deflection.

Thus care must be taken where large deflections are to be obtained either to keep the total height of the slabs small compared with the linear dimensions of the loaded area or to provide a guide for the slabs to improve stability.

These slabs were then placed in two groups of seven each at an angle of 22 degrees to the horizontal, as shown in Figure 7. In this figure also it can be seen that after some 18% deflection, instability crept in. When guide pins were placed in four of the holes and the experiments repeated, this instability had not appeared up to deflections of 24%, as can be seen in Figure 8.



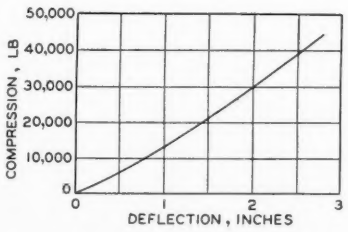
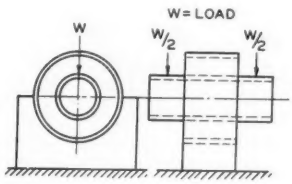


Fig. 8. Compression Loading of a Set of 14 Rubber Slabs, B. F. Goodrich Rubber, 38 Durometer, Compound 9250

(Dimensions, 20 X 12½ X 1.68 in.; 105 holes 1-in. diam.; 104 holes ½-in. diam. in each slab; four guide pins ⅝-in. diam. in each set of slabs.)

Torsion Bushings

Torsion rubber bushings are becoming quite popular, and occasionally they are used where no provision is made



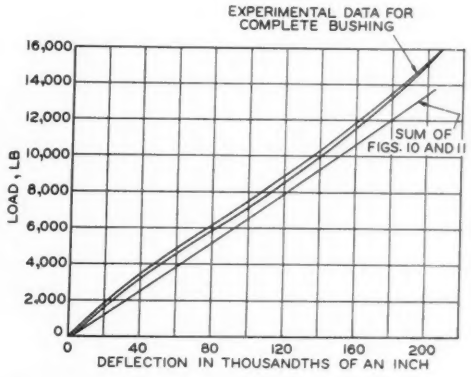
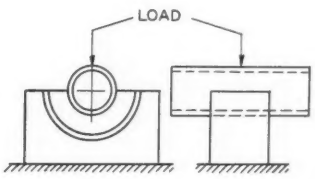


Fig. 9. Loading of Rubber Bushing 90 Degrees to Axis of Bushing.

(Dimensions of rubber; 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long; 45 durometer rubber.)



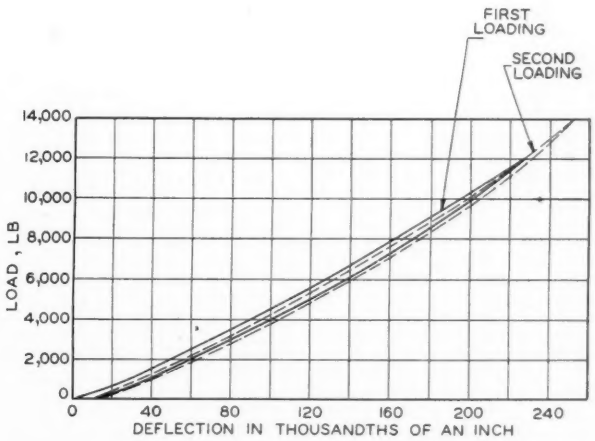


Fig. 10. Loading of One Half of a Rubber Bushing with Rubber in Compression

(Dimensions: 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long; 45 durometer rubber.)

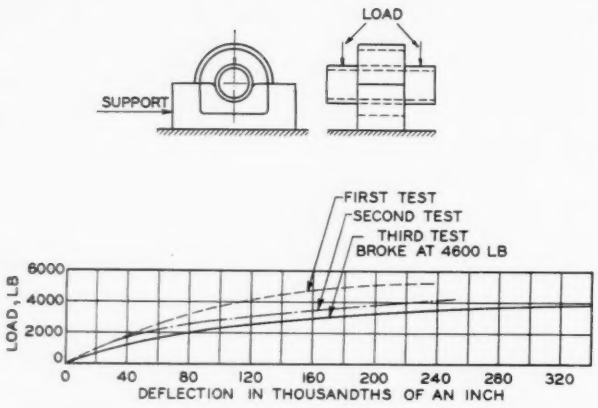


Fig. 11. Loading of One Half of a Rubber Bushing with Rubber in Tension

(Dimensions: 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long; 45 durometer rubber.)

for insuring concentricity. Thus a torque arm may be applied to either the inner or outer metallic bushing, and unless this torque arm is equalized, a load can be applied to the rubber perpendicular to the axis. In order to find the radial deflections to be expected with a particular sample of rubber bushing, the experiment shown in Figure 9 was performed. This consisted in loading the inner cylinder relative to the outer while maintaining the outer one in a fixed position. With such loading conditions the stresses in the rubber are of various types. At the bottom the stress is compression; at the top, tension; at the sides, shear; and at other points, combinations of those would be expected. Unfortunately the rigidity of rubber under all three conditions would be extremely difficult to calculate. In order to get a rough figure for the relative importance of the various items, this bushing was cut in two, and the lower half loaded in compression as shown in Figure 10. The bushing was then turned upside down and this same half bushing loaded in tension as shown in Figure 11. For a given deflection the sum of the half bushing loaded in compression and the half bushing loaded in shear was obtained and a curve plotted on Figure 9. It will be seen that this does not quite check the original curve so that the two cannot be considered independently.

In Figure 9 it can be seen that, over most of the range, the slopes of the curves are quite similar. In order to determine roughly how effective each part of the bushing was in withstanding tension and compression, the bushing was cut still further, as shown in Figures 12 and 13. It will be noticed that under a static deflection of 0.200-inch the half cylinder maintained a compression load of about 10,000 pounds (Figure 10). When 15 degrees had been removed from each side (Figure 12) a deflection of 0.200-inch was obtained with a load of 4800 pounds, although only one sixth of the rubber had been removed from the half cylinder.

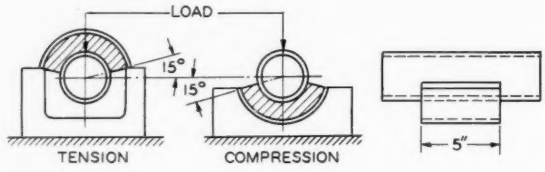
Comparing Figures 11 and 12 for tension values, it will be seen that for the same rubber reduction of one sixth at 0.100-inch deflection the load is reduced from approximately 2400 pounds to 1450 pounds.

Thus the influence on resistance to radical movement of the side parts of the bushing is quite appreciable.

Continuing the test in tension the data in Figure 13 were obtained. Notice that for 0.100-inch deflection a load of about 1050 pounds is carried, although only one third of the half bushing has been cut away. Unfortunately this part of the bushing was damaged at the completion of this test so that the compression curve was not obtainable.

In Figure 14 data on radial movement have been plotted for a bushing where the length decreased with increase in radius.

Frequently bushings of this general type are loaded nonsymmetrically, and one cylinder is twisted relative to the



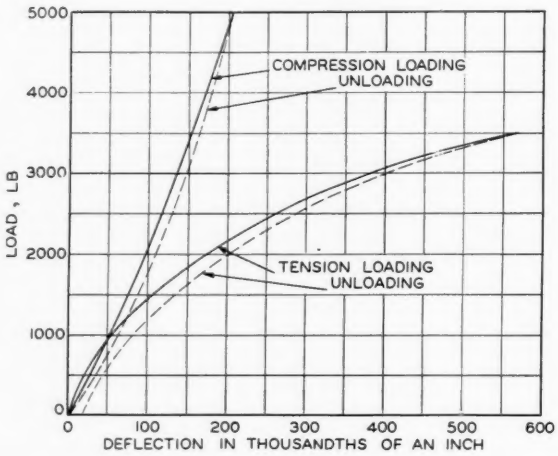
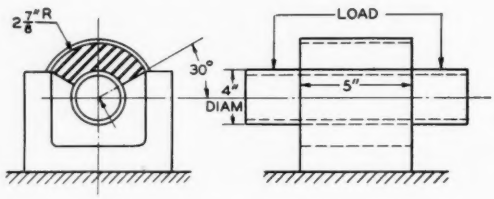


Fig. 12. Loading of a Section of a Rubber Bushing in Tension and Compression

(Dimensions: 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long; 45 durometer rubber.)



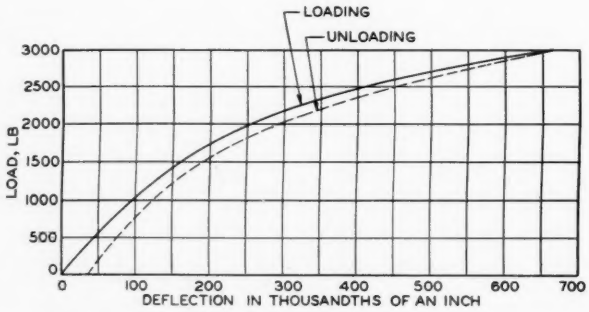


Fig. 13. Loading of a Section of a Rubber Bushing in Tension

(Dimensions: 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long; 45 durometer rubber.)

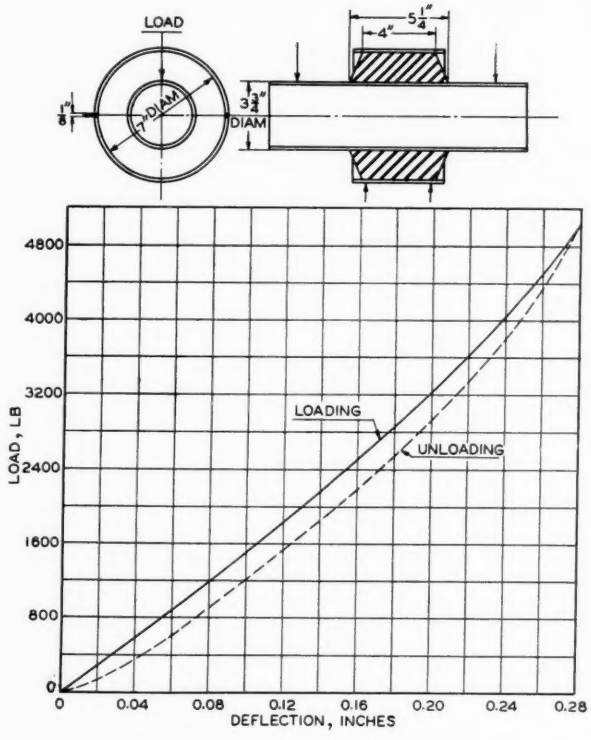


Fig. 14. Load Deflection Curve of a Metal-Clad Rubber Bushing, 50 Durometer Rubber

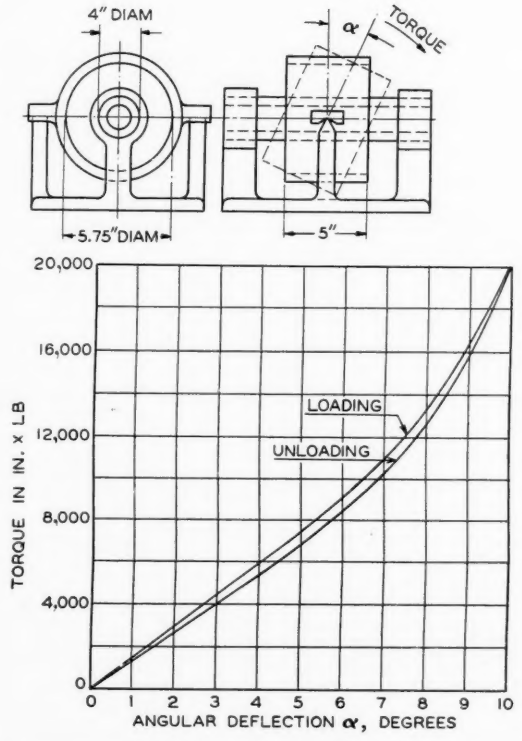


Fig. 15. Deflection Curve of a Metal-Clad Rubber Bushing Twisted Around an Axis 90 Degrees to Axis of Bushing

(Dimensions: 4-in. inside diam.; 5.75-in. outside diam.; 5 in. long, modulus of elasticity, 76 psi in shear, 228 psi in compression.)

other in the manner shown in Figure 15. This bushing is the same one shown in Figure 9.

Every test described in this paper was performed with rubber vulcanized to metal.

Acknowledgments

Some of the experimental data were obtained in the laboratories of the Edw. G. Budd Mfg. Co. by D. Birkin, R. J. Lee, and F. Heinze, and the author appreciates the cooperation of the company in this work.

PVA—Polyvinyl Alcohols[1]

Polyvinyl alcohols (PVA) are white to creamy-white powders, odorless and tasteless, and readily soluble in water. However, where it is required that products of PVA be resistant to water, various means are available for accomplishing this result. These methods vary from simple heat treatment to treatment with such materials as formaldehyde, chromium compounds, certain dyestuffs, dibasic acids, or copper-ammonia compounds.

Dry PVA can be mixed with plasticizers and then be molded and extruded under moderate conditions of temperature and pressure to make rubber-like articles. Molded PVA articles such as sheets, gaskets, diaphragms, washers, and tubing, are said to be characterized by elasticity, toughness, flexibility, and heat resistance, in addition to having PVA's characteristic resistance to the action of oils, fats, and most organic solvents including chlorohydrocarbons, aromatic hydrocarbons, carbon disulphide, alcohols, esters, ethers, ketones, etc. They are also said to be resistant to the action of oxygen, ozone, and to deterioration caused by vibration and flexing. The tubing, in addition to the above-mentioned characteristics for the molded products, has the ability to transmit sound with minimum distortion and little absorption by the tube wall. The effect of various solvents on the extruded tubing samples is indicated by the following tensile strength figures (pounds per square inch) after immersion in solvents for 240 hours at room temperature: original material before immersion, 5,236; gasoline (leaded), 5,255; kerosene, 5,247; benzene, 5,290; xylol, 5,351; acetylene gas, 5,340; trichloroethylene, 5,140; carbon tetrachloride, 5,084; ethanol (anhydrous), 5,779; ethylene glycol, 4,335; acetone, 5,203; diethyl ether, 4,980; and butane gas, 5,352.

From aqueous solution of PVA, tough, flexible films can be prepared which, in addition to being resistant to solvents, possess a high degree of impermeability to gases. Transparent gloves are among the products being developed from these solutions. Metallic surfaces may be protected during fabrication, assembly, or shipment by a thin film of the material which may be removed later by soaking in water.

PVA solutions are said to be powerful adhesives for binding particles of pigments and other solids to each other and to base materials such as paper, cloth, and leather. It is possible to blend PVA solutions with other adhesive materials such as rubber latex, starch, casein, and soya-bean protein to give products with good properties. Also, certain grades of PVA act as thickeners for rubber latex and neoprene latex, and such blends appear to be of interest in the adhesive field.

[1] Abstracted from a technical bulletin, issued by the producers of PVA, R&H Chemicals Department, E. I. du Pont de Nemours & Co., Niagara Falls, N. Y.

EDITORIALS

Progress in the Rubber Situation

IN CONTRAST to the conditions existing in many other industries so vital to the attainment of such a state of preparedness as may be considered to be satisfactory, the rubber industry is not confronted with the problems of plant capacity or skilled labor, but from the viewpoint of an extended future it is concerned with the continuity of supply of its basic raw material. During the past year plans have been laid and considerable progress has been made toward the realization of a reserve inventory position which would permit an efficient change to other materials in case the normal supply of natural rubber were interrupted.

At the end of November, 1939, United States stocks of crude rubber were 118,535 long tons and stocks afloat to the United States were reported at 114,044 tons; while in November the consumption was 54,322 tons and imports were 42,586 tons. At the same time reclaimed rubber stocks were estimated at 22,362 long tons; while for November of that year consumption was reported to be 18,006 tons with a production of 20,755 tons. Only two types of synthetic rubber were being produced in the United States, and they were being used commercially only for specialized purposes where natural rubber was not equally satisfactory.

After the expiration of 12 months the situation is quite different. The total stocks of crude rubber in this country on November 30, 1940, were reported at 276,943 tons, and stocks afloat to United States ports were 158,095 tons with actual imports during November at 72,901 tons; while the month's consumption of 54,652 tons was approximately the same as in November, 1939. Likewise the position of reclaimed rubber was somewhat improved during the year, stocks on November 30, 1940, being reported at 33,143 long tons in comparison with consumption of 16,042 tons and production of 17,689 tons in November, 1940. At this time production of six distinct synthetic rubbers is being carried on. In some instances only pilot plants are being operated, but facilities for increased production are being established in many instances, and the knowledge of processing methods and application possibilities is much more extensive than it was a year ago. Likewise a number of other materials have proved to be capable of rendering acceptable service in many instances where rubber has been used. Even though the demand for rubber or some similar material is increasing, our utter dependence upon a single material is considerably lessened, and in the event of an interruption in our crude rubber supply the necessity for drastic curtailment of normal uses is not as imminent today as it would have been a year ago.

Even though the combined natural rubber stocks in and afloat to the United States have increased from slightly over a four months' position to approximately an eight months' supply, this improvement does not entirely represent the progress that has been made. The permissible export quota has been raised from 80% of basic quota in force during the first quarter of 1940 to 100% for the same period in 1941. The Rubber Reserve Co. has been formed by the Federal Government and has been functioning for several months toward the accumulation of an additional 330,000 long tons to be held for emergency use only.

However our position has not been sufficiently improved to justify any relaxation in our efforts. The task of safeguarding the supply of raw materials for the rubber industry involves the collective consideration of several mediums, no one of which gives promise of being individually sufficient. Consideration is and should be given to the coordination of the various possibilities such as: completion of the government planned reserve of natural rubber; full capacity production of reclaimed rubber until a reasonable surplus of feasible types has been attained; suitable organization of scrap rubber collection media so as to guarantee acceleration when needed; more extended use and production of commercial "synthetic rubbers" resulting in greater knowledge of their use and processing; survey of the possibilities of utilizing other rubber-like materials in certain applications for which rubber has been regarded as essential; and the forced growth of Guayule rubber in greater quantities together with research as to its wider use in modified forms.

The problem is not a question of possibility, but rather one of organization and coordination of a number of contributing materials so that in an emergency each can rapidly assume its portion of the burden. Through analysis of the possibilities of each medium a consolidated program, if speedily consummated, can successfully prepare for any possible emergency.

Greetings of the Season

AT THE expiration of another year the editorial staff and publishers of INDIA RUBBER WORLD extend greetings and cordial wishes for a pleasant New Year to the members of the rubber and allied industries. We express our appreciation for the happy associations which we have enjoyed during the past and pledge ourselves to continue our efforts to merit the confidence placed in us and the spirit of cooperation which has been displayed by those with whom we have had such pleasant relations. It is our sincere hope that the good things of 1940 may become greater in number and richer in quality so that during 1941 there may come to all a realization of the satisfaction such as may be derived only from having contributed to progress and mutual advancement.

EDITOR

What the Rubber Chemists Are Doing

Rubber Division, A. C. S., Activities

Reclaim's Position Discussed before Boston Group

GILBERT S. TRIMBLE, vice president of the Midwest Rubber Reclaiming Co., discussed various economic and technical aspects of reclaim's position in the event of a crude rubber shortage in this country, before the Boston Group, Rubber Division, A. C. S., at its meeting on December 13 at the University Club, Boston, Mass. This meeting also featured election of officers and distribution of gifts made available through funds from the group's treasury. There were 165 members and guests present at dinner, and a somewhat greater number at the meeting which followed.

Officers for 1941 are: chairman, H. S. Liddick, Davidson Rubber Co.; vice chairman, D. D. Wright, Hood Rubber Co.; secretary-treasurer, L. R. Clarke, Haartz-Mason-Grower Co.; and executive committee T. M. Knowland, Boston Woven Hose & Rubber Co., and K. B. Osborn, General Latex & Chemical Corp. J. C. Walton, of Boston Woven Hose, the retiring chairman, automatically becomes a member of the executive committee.

Mr. Trimble, before going into the present and future status of reclaim, reviewed its history from the early days of vulcanization, citing the following steps in its evolution: Goodyear patent on the use of ground rubber as a filler; Hancock patent on boiling scrap shreds in turpentine; Beer patent of 1855 on boiling scrap in lye (a forerunner of the Mark's process); Clapp process of 1871 which involved air blasting followed by treatment with live steam; Mitchel's acid process of 1881; and finally the successful alkali process of 1899, developed by Arthur Marks.

The speaker then pointed out that only 1,700 tons of synthetic rubber were consumed here in 1939 as compared with 600,000 tons of crude rubber, and that we can reasonably expect a 10,000-ton or even 15,000-ton capacity for synthetic rubber in another year. But he warned that, because of costs of production and technical considerations in production and utilization, it would probably be years before synthetic rubber would make us independent of the Far East.

After commenting on our program for accumulating crude rubber in 1941, Mr. Trimble stated that a recent survey showed that our national reclaiming capacity was close to 300,000 tons annually on a seven-day production basis and that there was ample scrap to operate even a greater capacity. Emphasizing the immediate and long-time future helpfulness of the reclaiming industry in a sudden emergency, the speaker pointed out other supplementary measures: rationing of rubber supplies, curtailment of automobile travel, substitution of other materials, and the possibilities of Guayule rubber expansion in our Southwest. He declared that tests on deresinated Guayule have shown the quality to be equal to that of standard crude rubber.

Although reclaim could not entirely replace crude rubber, Mr. Trimble said that in automotive uses other than tires reclaim could be substituted 100%. He also gave formulas and test data on all-reclaim tread and carcass stocks that, when used in tires for taxicab service, ran about 5,000 miles and he expressed the belief that this mileage could be doubled through research efforts.

William Welch, president of Midwest, then remarked on the relation between synthetic rubber and reclaim, emphasizing that there was no basic conflict between these two materials. He predicted that synthetic would probably replace crude rubber in whole or part within the lives of those present and pointed out that reclaimers recognize the problem of reclaiming synthetic rubber. He spoke of the contract that Midwest had entered into with Massachusetts Institute of Technology for a five-year research program on the reclaiming of synthetics. Mr. Welch also stressed the stability of present reclaim prices and warned of the danger of inflation in our national economy as the result of wartime conditions. The motion picture "Rubber Reborn," filmed in 1938, but brought out again because of renewed interest in reclaim, was shown in conclusion.

Los Angeles Group Elects Horchitz as President

LEON HORCHITZ, of the B. F. Goodrich Co., was elected president of the Los Angeles Group, Rubber Division, A. C. S., at a meeting on December 3, at the Mayfair Hotel, Los Angeles, Calif. Other officers for 1941 elected at the meeting are: vice president, G. K. Norton (Kirkhill Rubber); secretary, F. L. Shaw (Darnell); treasurer, (reelected) L. F. MacDonald (Goodrich); and executive committee, F. W. Woerner (C. P. Hall), C. H. Churchill (Muehlstein), and Victor Vodra (R. T. Vanderbilt). The meeting was attended by approximately 120 members and guests.

The first speaker of the evening was Dr. Gustave F. Struve, agriculturist of note and the only surviving member of an ill-fated expedition into the jungles of Brazil. Dr. Struve spoke of the beauty of the jungle and the deadly malaria which decimated the members of the botanical expedition. He told of his capture by head hunters of the Amazon who forced him to marry the chief's eleven-year-old daughter and his subsequent escape. After describing how the head hunters prepared and shrunk their specimens of human heads, Dr. Struve exhibited a head and also a complete body that was only 13 inches tall.

The second speaker, Dr. Roy S. Marsh, an educational director of the Civilian Conservation Corps, chose as his subject, "The C.C.C.—A Great Defense Factor." Dr. Marsh centered his remarks upon an evaluation of the results of the C.C.C., particularly in respect to our defense program and told how jobs were being found for enrollees when they left the organization. The program was completed with a motion picture, "A Cavalcade of Sports," presented by O. A. Coons.

Two door prizes, one a portable radio donated by the group, and the other a turkey donated by the San Francisco Sulphur Co., through E. L. Royal, were won by R. K. Heavilon (U. S. Rubber) and F. H. Cota (Goodyear), respectively. The special prize, two tickets to the Notre Dame-Southern California football game, which were donated by the New Jersey Zinc Co., was won by W. B. Holmes (Dill Mfg.). Packages of golf tees as table favors were presented by the Monsanto Chemical Co., through Art Kroeger of that firm; while cigars were distributed by Ed. Royal, of H. M. Royal, Inc. An American flag, presented to the group by H. M. Royal through Ed. Royal, was on display during the evening.

Among the guests present were W. H. Cole (U. S. Rubber), of Sumatra, and L. H. Robbins (Goodrich), of Sweden. The next meeting of the group will be on February 4.

Talk and Film on Plastics Given at Buffalo Meeting

WILLIAM HOYT, JR., of the Bakelite Corp., delivered an interesting talk on modern plastics and molding technique at a short technical session held before dinner at the Christmas meeting of the Buffalo Group, Rubber Division, A. C. S., which was held at Hotel Lenox, Buffalo, N. Y., on December 17. Mr. Hoyt amplified his remarks by displaying an unusual collection of plastics and showing the sound movie, "The Fourth Kingdom." Altogether about 70 members and guests were present at the meeting, which was under the chairmanship of B. W. Wetherbee (Globe Woven Belting), who was assisted by J. M. Cranz (J. M. Cranz), chairman of the entertainment committee.

After the technical session the remainder of the evening was given over to dinner, drawings for prizes, and professional entertainment with Horace M. Taylor, brother of the radio-famous Colonel Stoopnagel, as master of cere-

monies. The excellent gifts for this Christmas meeting were presented by the following firms:

Binney & Smith Co.; Callaway Mills; Continental Carbon Co.; General Atlas Carbon Co.; INDIA RUBBER WORLD; Monsanto Chemical Co. (Rubber Service Division); H. Muehlstein & Co., Inc.; F. F. Myers Co.; Naugatuck Chemical Division of United States Rubber Co.; New Jersey Zinc Co.; Philadelphia Rubber Works; *The Rubber Age;* R. T. Vanderbilt Co., Inc.

Christmas Party and Ladies' Night Held by Chicago Group

THE Chicago Group, Rubber Division, A. C. S., held its annual Christmas Party and Ladies' Night on December 20 at the Hotel Sherman, Chicago, Ill. Prior to dinner a reception was held in the Crystal Room for the 246 members and their ladies present. A souvenir was presented to each woman and a number of door prizes were distributed to the men. After the reception the members were entertained in the College Inn, where dinner was served and additional door prizes were presented. The reception, ladies' souvenirs, and prizes for the men were supplied through the generosity of the following firms:

The Akron Standard Mold Co.; L. Albert & Sons; American Zinc Sales Co.; Binney & Smith Co.; Godfrey L. Cabot, Inc.; The Carter Bell Mfg. Co.; The Cleveland Liner & Mfg. Co.; Commerce Petroleum Co.; Continental Carbon Co.; E. I. du Pont de Nemours & Co., Inc.; General Atlas Carbon Co.; C. P. Hall Co.; Herron & Meyer, Inc.; International Smelting & Refining Co.; Geo. S. Mepham Corp.; Midwest Rubber Reclaiming Co.; Monsanto Chemical Co.; H. Muehlstein & Co., Inc.; Naugatuck Chemical Division of United States Rubber Co.; The New Jersey Zinc Co.; Pequanoc Rubber Co.; The Philadelphia Rubber Works; A. Schulman, Inc.; Henry L. Scott Co.; The Stamford Rubber Supply Co.; Thiokol Corp.; Titanium Pigment Corp.; United Carbon Co.; R. T. Vanderbilt Co.; Wishnick-Tumpeer, Inc.

Detroit Group Elects Phillips of General Motors

W. M. PHILLIPS, of the Research Division, General Motors Corp., was elected chairman of the Detroit Group, Rubber Division, A. C. S., at its Christmas party on December 13, which took place at the Detroit-Leland Hotel, with over 200 members and guests present. Other officers elected for 1941, who also make up the executive committee, follow: vice chairman, J. H. Doering, Tire Division, Ford Motor Co.; secretary-treasurer, E. J. Kvet, Baldwin Rubber Co.; chairman of program committee, Fred Wehmer, Minnesota Mining & Mfg. Co.; chairman of plastics committee, W. B. Hoey, Bakelite Corp.; chairman of entertainment committee, J. H. Norton, E. I. du Pont de Nemours & Co., Inc.; chairman of membership committee, A. Fuhrman, Midwest Rubber Reclaiming Co.; chairman of publicity committee, J. C. Dudley, Chrysler Corp. In addition, W. G. Nelson, United States Rubber Co., was named counsellor to the American Chemical Society and its Rubber Division.

Entertainment and music for the party were furnished by the Ford Mountaineers; while the speaker, M. W. Bingay, columnist for the *Detroit Free Press*, compared world conditions of today with those of the early historic period in his talk on "Where Do We Go From Here?" The party featured distribution of gifts to fortunate ticket holders. The success of this event was due to the donations of the following:

Baldwin Rubber, Binney & Smith Co., Godfrey L. Cabot, Inc., Chemical Products Co., Continental Carbon Co., du Pont, General Tire & Rubber Co., C. P. Hall Co., Herron & Meyers Co., J. M. Huber, Inc., Industrial Rubber Goods, Johnson Rubber Co., Midwest Rubber Reclaiming, Minnesota Mining, Monsanto Chemical Co., H. Muehlstein & Co., Inc., Naugatuck Chemical, Division of U. S. Rubber, New Jersey Zinc Sales Co., Ohio Rubber Co., Pequanoc Rubber Co., Philadelphia Rubber Works Co., Piqua Stone Products, St. Clair Rubber Co., Standard Chemical Co., Titanium Pigment Corp., United Carbon Co., R. T. Vanderbilt Co., Wishnick-Tumpeer, Inc., and Xylos Rubber Co.

New York Group Christmas Party Attracts 400

FEATURING the distribution of over 140 attractive gifts, the New York Group, Rubber Division, A. C. S., held its annual Christmas Party on December 20 at the Building Trades Club, 2 Park Ave., New York, N. Y., with 400 members and guests in attendance. Also on the program were the election of officers for 1941, dinner and music, and motion pictures taken at Massachusetts Institute of Technology on applications of the ultra-high-speed camera.

Newly-elected officers for 1941 are: chairman, K. J. Soule (Manhattan Rubber); vice chairman, F. E. Traflet (Pequanoc); executive committee (for three-year terms), R. E. Casey (Naugatuck Chemical), Lawrence Edland (R. T. Vanderbilt), G. J. Wyrough (Whitehead Bros.); sergeant-at-arms, M. E. Lerner, (*Rubber Age*); and secretary-treasurer, B. B. Wilson (INDIA RUBBER WORLD). The above executive members will serve with the following previously elected members: S. G. Byam (du Pont), I. Drogin (United Carbon), G. W. Winchester (Norwalk Tire & Rubber Co.), M. R. Buffington (Lea Fabrics), W. F. Tuley (Naugatuck Chemical), and D. A. Shirk (Rare Metal Products). P. P. Pinto (*Rubber Age*), who was secretary-treasurer for 1940, becomes an ex-officio member of the committee.

The outstanding popularity of this annual affair has been due to the attractive gifts that have been distributed to holders of lucky tickets. This year's gifts, which, according to comments, were unusually attractive, were made possible through the generous donations of the following firms:

Admiar Rubber Co., Inc., Advance Solvents & Chemical Corp., Akron Standard Mold Co., Anaconda Sales Co., Binney & Smith Co., Godfrey L. Cabot, Inc., Calloway Mills, Carter Bell Mfg. Co., Cleveland Liner & Mfg. Co., Continental Carbon Co., E. I. du Pont de Nemours & Co., Eagle Pencil Co., Farrel-Birmingham, Inc., Flintkote Co., General Atlas Carbon Co., Givaudan-Delawanna, Inc., C. P. Hall Co., J. M. Huber, Inc., Imperial Paper & Color Corp., INDIA RUBBER WORLD, E. E. Krumeich Co., Monsanto Chemical Co., Moore & Munger, H. Muehlstein & Co., National Rubber Machinery Co., National Sherardizing & Machine Co., Naugatuck Chemical Division of United States Rubber Co., New Jersey Zinc Co., Pequanoc Rubber Co., Philadelphia Rubber Works Co., Pittsburgh Plate Glass Co., Rare Metal Products Co., Rayon Processing Co. of R. I., Revertex Corp. of America, *Rubber Age*, Rubberset Co., St. Joseph Lead Co., A. Schrader's Son, A. Schulman, Inc., Henry L. Scott Co., Southwark Mfg. Co., Speed Products Co., Stamford Rubber Supply Co., C. J. Tagliabue Mfg. Co., Textile Proofers, Inc., Thiokol Corp., Titanium Pigment Corp., Thompson, Weinman & Co., Inc., United Carbon Co., R. T. Vanderbilt Co., Vansul, Inc., Wishnick-Tumpeer, Inc., Xylos Rubber Co.

Akron Group to See Film on Steel

ON JANUARY 24 the Akron Group, Rubber Division, A. C. S., will meet at the Akron City Club, Akron, O., with dinner scheduled for 7 p.m. The program, which will be conducted by Reid Pierce, of the American Steel & Wire Co., will relate to the production of steel and will include sound pictures in color on this subject.

National Chemical Exposition Attracts Large Audience

OVER 33,000 visitors attended the National Chemical Exposition, held at the Stevens Hotel, Chicago, Ill., from December 11 to 16, under the auspices of the Chicago Section of the American Chemical Society. Of the 90 exhibits, 43 were of equipment, 23 of raw materials and other chemicals, 17 of laboratory apparatus, and seven of miscellaneous, all of which were of first interest to the chemical industry. The accompanying conference, announced in our December issue and at which P. K. Frolich discussed synthetic rubber, was well attended.

President-Elect of A. C. S.

DR. HARRY N. HOLMES, head of the department of chemistry of Oberlin College, Oberlin, O., has been elected president of the American Chemical Society for 1942. He takes office as

president-elect on January 1, 1941, when Prof. Wm. Lloyd Evans, head of the department of chemistry at Ohio State University, becomes president of the society.

Wide-Base-Rim Symposium Set for SAE Meeting

A WIDE-BASE-RIM symposium will be held at 10 a.m., January 9, as a part of the annual meeting of the Society of Automotive Engineers, scheduled for January 6 to 10, at the Book Cadillac Hotel, Detroit, Mich. Taking part in the symposium will be: E. A. Roberts, Firestone Tire & Rubber Co.; R. D. Evans, Goodyear Tire & Rubber Co.; S. M. Cadwell, United States Rubber Co.; and a representative of The B. F. Goodrich Co. In the afternoon of January 9, L. B. Sebrell and R. P. Dinsmore, both of Goodyear, will present a paper, entitled "Properties of Some Synthetic Rubbers."

Notol—Toluol Replacer

TOLUOL, an important material for munitions manufacture which may become scarce because of this demand, may be replaced by Notol, a new development of The Neville Co., Pittsburgh, Pa. The new product, which is said to cost less than toluol, is characterized by a high nitro-cellulose dilution ratio and is slower evaporating and milder odored than toluol.

Ontario Rubber Section Meets

ON DECEMBER 19 the Ontario Rubber Section, Canadian Chemical Association, held a joint meeting with the Hamilton Chemical Association, at McMaster University, Hamilton, Ont. After a very enjoyable Christmas dinner, attended by 65 members and guests, I. E. Lightbown, of Standard Oil Development Co., spoke to the 170 present at the technical session on the subject "Butyl Rubber" and showed the motion picture of that name. After the presentation, a lively and instructive discussion took place. Refreshments were served at the meeting by the Hamilton Chemical Association.

The next meeting of the Ontario section will be held January 23 in the Chemistry Building, University of Toronto, Toronto, preceded by dinner at the Hart House. R. L. Sibley, director of research, Rubber Service Department of Monsanto Chemical Co., will speak on the "Reactions of Rubber." Dr. Sibley plans to review this field, and to discuss some possibilities of reaction not so well known, as well as some of the reactions of rubber discovered at Monsanto.

Rubber and Plastics Subdivision of A.S.M.E. Holds Meeting

FOUR technical papers, a report on subdivision activities, and luncheon featured a meeting of the Subdivision on Rubber and Plastics of the American Society of Mechanical Engineers, attended by 40 members and guests and held at the Hotel Astor, New York, N. Y., on December 5, in conjunction with the sixty-first annual meeting of the Society. Also of interest to the rubber industry was a paper on "Safety Features on Mills for Rubber and Plastics," by J. Milward, Wm. R. Thropp & Sons Co., Trenton, N. J., presented at a safety session on December 4. Mr. Milward's paper and the paper entitled "Rubber Springs under Compression Loading," by J. F. Downie Smith, United Shoe Machinery Corp., Beverly, Mass., are presented in full elsewhere in this issue. Abstracts of the other papers follow:

"Application of Phenolic Asbestos Compositions." Three grades of phenolic-resin asbestos plastics, known commercially as Haveg, which find use in lining acid-resisting equipment are described. The use of a special acid-digested asbestos and a simplified molding technique that does not involve hydraulic press equipment are mentioned. Specific data are included for cylindrical tanks, towers, rectangular tanks, pipe, fittings, and fume ducts. W. H. Adams, Jr., Haveg Corp., Newark, Del.

"Notes on the Creep of Neoprene in Shear." Preliminary data on the creep of neoprene in shear are presented. Single shear sandwiches of neoprene, two inches in diameter, ½-inch thick, and vulcanized between steel disks, ¼-inch thick, were loaded with a dead weight of 150 pounds to give a unit shear load of 47.7 pounds per square inch. Under these circumstances it is shown that the creep rate of a given base composition can be varied by the addition of physical modifiers such as softeners or reenforcing pigments. Furthermore the dependence of creep upon the base compound is illustrated by a group of base compositions with widely different properties. A rubber control included for comparison is near the lower limit of the creep range shown by the neoprene compositions. No correlation exists between resilience and creep, and creep must be evaluated as a separate property when it is involved in a given application. The data illustrate the complexity of a very limited portion of the creep problem, and future work should investigate other factors such as various loads, temperatures, and degrees of vibration. F. L. Yerzley, E. I. du Pont de Nemours & Co., Inc., Wilmington.

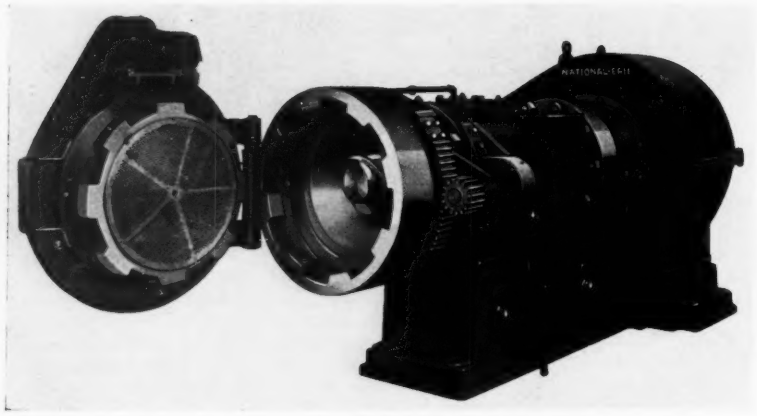
"The Creep of Natural and Synthetic Rubber Compounds in Shear." Typical shear-creep data are presented for a few compounds of natural and synthetic rubbers, including Neoprene Type E, and a butadiene copolymer. The compounds were studied at stresses of 50, 75, and 100 pounds per square inch at both 80 and 140° F., some for periods up to 900 days. On logarithmic coordinates the creep curves are satisfactorily represented by straight lines for most of the time. Creep curves at 80 and 140° F. were found to be similar, although in 640 days at 50 pounds per square inch the ratios of creep at the two temperatures ranged from 2 to 9. The constants of the creep equation were from 3 to 260% greater at 140 than at 80°. The creep characteristics of natural and synthetic rubber can be controlled over a wide range by proper use of compounding ingredients. The tests also show that with proper compounding the load carrying ability of rubber can be maintained at 140° F. for long periods. Stuart H. Hahn and Ivan Gazdik, B. F. Goodrich Co., Akron, O.

The report of the Subdivision, presented by Mr. Yerzley, chairman, covered advances in rubber and plastics during 1940. Contributions to the report, which was preliminary, were requested. The section of the report on rubber emphasized the attention that has been given to the question of rubber supply and pointed out the adverse economic and technical aspects of large-scale production of synthetics today. The increase in the number of applications of rubber in mechanical structures was illustrated in the case of automobiles by the statement that the number of rubber parts in the 1941 models was approximately double that of models of the previous year.

Mr. Yerzley mentioned some of the outstanding contributions of 1940 to our knowledge on the properties of rubber, concerning: the effect of shape upon the overall stiffness of rubber springs; vibration isolation and transmissibility characteristics; effect of fatigue on the life of the spring; and combined types of loading in mountings which employ various degrees of compression, extension, and shear. He also expressed the hope that theory may provide a satisfactory method of comparing elastic supports, independent of their shape. The report also urged that specifications be based on mechanical properties rather than on chemical composition.

The section of the report on plastics covered developments in molding, fabricating, application, testing, and properties. It was pointed out that no really new plastics appeared on the market in 1940 and that increased volume and new outlets were due especially to the vinyl ester resins and cellulose acetate butyrate. Free copies of the report may be obtained from Mr. Yerzley by writing him, care of Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Wilmington, Del.

New Machines and Appliances



Large Diameter National-Erie Strainer

12-Inch Strainer

A 12-INCH strainer, when operated at a screw speed of 30 r.p.m., is said to deliver approximately 7,000 pounds of crude rubber per hour. The machine is equipped with a cast-steel breech locking delivery head which carries a 25-inch perforated strainer plate. The cylinder is of alloy cast iron and lined with hard alloy steel. The strainer has an independently housed thrust unit that is equipped with heavy-duty roller bearings. A heavy cast-iron oil-tight case encloses the drive which is equipped for double reduction with alloy steel gears. These gears have machine-cut Sykes-type herringbone teeth and utilize heavy-duty roller bearings. Gears and bearings are lubricated by means of a positive splash feed system. National-Erie Corp., Erie, Pa.

National Extruder for Plastics

IN RECENTLY designed equipment, plastics in the shape of rods, ribbons, tubing, special molding, and insulated wire are continuously extruded. The machine comprises an extrusion unit, the cylinder of which is heated by either steam or hot oil. The oil is circulated by means of circulating pumps built into a compact heating unit with controls to maintain uniform temperature. A special variable-speed cooling and stretching conveyer also forms a part of the unit.

The extruder utilizes a special screw design and cylinder length said to assure thorough plasticization of the raw material and a special head for shaping. National Rubber Machinery Co., Akron, O.

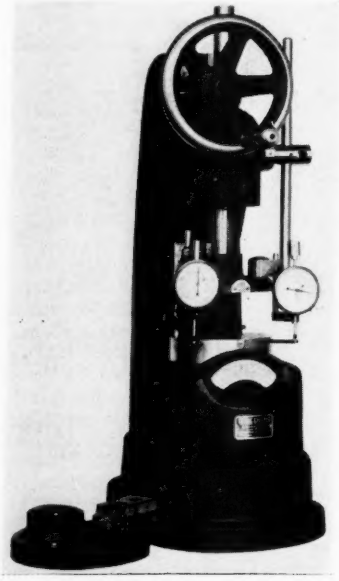
Rubber Compression Tester

THE Model PR5-1000-C compression tester is designed for making compression tests on rubber samples and finished rubber products within the load range of the tester, 0 to 1,000 pounds. A quickly interchangeable weighing unit of 0 to 500 pounds' capacity may be used where lower loads are specified.

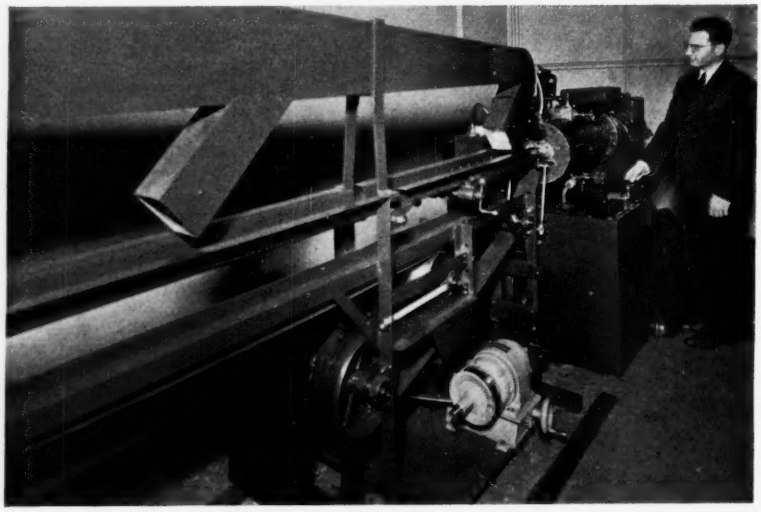
The tester has an adjustable compression head assembly which will accommodate samples up to 9½ inches high. There are two dial indicators. The one shown at the right in the photo is of the reverse-reading type with a one-inch travel, by means of which the thickness or height of the sample may be read directly to 0.001-inch. The indicator at the left is a direct-reading type with a one-inch travel, which reads to 0.001-inch and shows the exact deflection at various loads as they are applied. Both indicators are adjustable over a compression range of four inches.

Load is applied by the hand-wheel shown, but for light loads (up to 200 pounds) the lever at the right may be used. If desired, a power drive is available, geared down to give a ram travel of about one inch in five to ten seconds. With this arrangement an automatic stop for a pre-set compressed height is provided, together with safety overtravel stops at both top and bottom. For production testing a power driven unit with electronic control may be used. This arrangement automatically indicates by a flash of neon lamps whether or not the rubber product comes within specified limits.

The machine is 34 inches high, with a base 12 inches wide and 19 inches long, and weighs about 175 pounds. The weighing table and compression head are six inches in diameter. The dial of the 1000 pounds weighing unit is graduated to two pounds, while that of the 500 pound unit is graduated to one pound. Link Engineering & Mfg. Co.

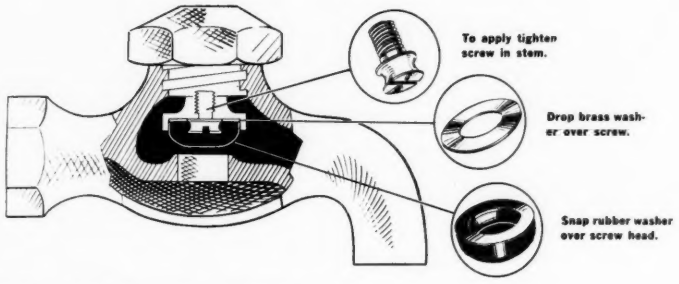


Link Compression Tester



National Plastics Extrusion Unit

New Goods and Specialties



Installation of No-Pans Snap-On Washer

Snap-On Faucet Washers

THE No-Pans Snap-On Washer consists of a brass screw, a brass washer, and a rubber washer that snaps over the screw head. Its advantages, as listed by the inventor, are quick and easy fit, quiet and efficient operation, and long life. When the faucet is turned, the rubber washer does not turn, but adjusts itself snugly to the faucet seat and allows the screw head to move freely within the rubber washer. The brass screw is securely insulated by the rubber washer from galvanic action and water erosion. The unit is available in several sizes to fit all types of faucets, and parts are sold separately when needed. No-Pans Washer Co.

Power Belting

FABCO belting for general-purpose power transmission has a multiple, thin-ply construction which, it is said, gives the belt high flexing ability and eliminates pulley or belt take-up, often necessitated because of the severe distortion of belts passing over small pulleys. Fabco belt, of square-edged construction, utilizes a duck that weighs approximately 14 ounces to the square yard. Fabreeka Products Co., Inc.

Doenut Tire Has Valve on Outside of Rim

IN THE Doenut tire the valve, which is of short flexible rubber construction, is located entirely outside of the wheel rim, instead of in the usual position at the center of the tire. This design is said to prevent valve damage caused by "creeping" when the tire is under-inflated as well as keeping valve safe from curb scraping damage.

The tire is of single-tube construction and made with two or four plys for use on hand-motivated vehicles such as wheelbarrows, hand trucks, and street markers. The tire, which is said to utilize a special method of attachment to the wheel, is built in three sizes: 10 by 2.75 inches; 12 by 3.30 inches; and 16 by 4.40 inches. Musselman Products Co.

Musselman Doenut Tire

Rubber-Covered Spike for Baseball Shoes

INJURIES caused by the steel cleats ordinarily worn on the shoes of baseball players are said to be eliminated by the use of a steel spike encased in rubber. The rubber is permanently attached to the steel at the base of the spike, but is loose at the tip. An opening at the tip permits the steel spike to protrude when the rubber is pushed back. Thus when a player runs, his weight forces the unattached rubber back out of the way, and the exposed part of the spike bites into the ground. When he slides, however, there is no weight on the rubber; so it covers the full length of steel and thus prevents injury to anyone in his way. The spike was developed by The B. F. Goodrich Co., in conjunction with the Brady Research Co.

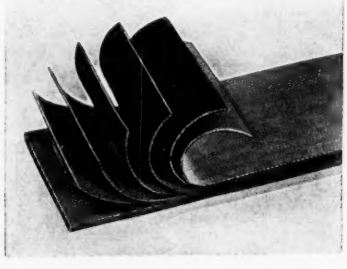
Baseball Shoe with Rubber-Encased Spikes: *Left Insert*, Rubber Compressed, and Spike Penetrating the Ground; *Right Insert*, Rubber in Normal Position and Spike Covered

New Cement with Latex Base

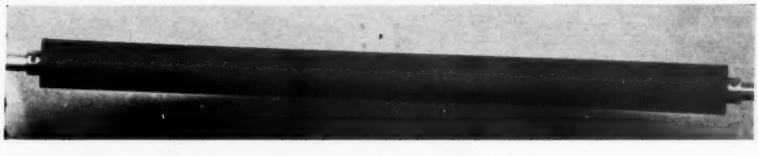
THE B. F. Goodrich Co., Akron, O., is marketing a new cement, Texglue, with a latex or rubber base and compounded to afford exceptional adhesive properties and resistance to aging. Noninflammable, with no objectionable odor, the cement can be stored in normal temperatures, but freezing temperatures or heat above 90° should be avoided. This new product is suggested for adhesion of fabrics, paper, leather, or other porous material to themselves or to nonporous surfaces from which the cement can be readily cleaned after it has served its purpose. As an easily removed office paste leaving clean paper surfaces, it is recommended for sealing packages, applying labels, and posting bulletins. It also can be applied as an anti-skid coating for rug bases and used to repair clothing and household furnishings and stop runs in hosiery.

Non-Slip Floor Wax Utilizes Neoprene

RESISTANCE to abrasion, heat, and sunlight is said to be imparted to a non-slip water wax by the use of neoprene, which also contributes to the non-slip qualities of the material. The wax is a heavy-duty industrial floor finish that dries to a high-gloss leathery film without rubbing, it is claimed. It may be used on the following surfaces, with a coverage of 1,000 to 2,000 square feet per gallon: concrete, terrazzo, marble, ceramic tile, wood, rubber tile, asphalt tile, linoleum, and cork. Flexrock Co.



Stripped Section of Fabco Belting



Curved-Bar Rubber Expander

Improved single-curved-bar expander designed to hold goods to width and eliminate wrinkles before passing into processing machines. The expander is fitted with an improved type of trouble-free bushing. Where considerable stretching of the fabric is desired, a three-roll expander is offered. Birch Bros., Inc.

UNITED STATES

Localized Increase in Business Seen

The national defense program continues to accelerate industrial activity and is expected for the next two years at least to be a contributing factor to this nation's prosperity, a prosperity, however, that will be specialized and localized in those communities devoted to war and related industries. Those fields which have lost their export markets, as agriculture, will suffer accordingly. Limited plant facilities in several lines may retard an increase in general activity this quarter, and, of course, regular seasonal declines in certain trades are to be expected. Somewhat rising prices, but not to too high a level, also are forecast. Manufacturers' inventories of raw materials are increasing, mainly as a protective measure.

The outlook for leather footwear production, now in seasonal decline, is seen as good for the first quarter. Output last year was estimated at 396,990,000 pairs, against the record of 424,136,000 pairs in 1939. Piano shipments last year were the greatest on record. Wool goods mills are operating at the highest rate in at least twenty years, and the future seems bright, with many plants planning to run on a three-shift basis for several months. The cotton spinning industry has been on a maximum-capacity basis. It is also believed that industrial construction will gain this year.

The glass industry continues at near capacity, and last month steel and tin production held steady at 97% and 48%, respectively. Paper and rayon output rose, but machine tools were down slightly. Fluctuations were registered for oil, lumber, and power output, carloadings, and the cotton mill rate.

Automobile production continues in good volume, although the seasonal peak was reached around the end of November. New orders have been declining partly because dealers have been cutting trade-in allowance ratios owing to heavy stocks on hand of used cars from previous sales.

The rubber industry continues to operate at about the same high level of the past few months and foresees further improvement after the new year. December footwear business was reported as very good, mechanicals and insulated wire good, and tires fair. Manufacturers' shipments of rubber products recently rose, but the value of inventories declined slightly.

EASTERN AND SOUTHERN

Advanced Research Problems

The Research Advisory Service, Bert H. White, director, recently completed a survey on industrial wants, based on 1,042 answers from America's industrial leaders to the question, "What new product, process, or material might industrial research develop that would be valuable to your industry?" The 12 objectives stated to be desirable to the rubber industry follow:

1. Development of a domestic supply of natural rubber or a suitable substitute at prices competing with natural rubber.
2. Development of suitable rubber materials and compounding technique which will permit the economic use of rubber in highway construction other than as fillers between the sections of concrete roadways.
3. Development of a form of rubber which would not lose so much of its traction on wet surfaces. Possibly some of the rubber substitutes could be formulated with some such property in mind.
4. A modified rubber or substitute material similar to crumb or powdered rubber which could be prepared and sheeted or molded without the high cost involved in present heavy machinery and processes preparatory to fabrication.
5. The development of a sheet rubber flooring which would be competitive with linoleums, taking into account the increased service which rubber offers.
6. Tires for the road-building equipment manufacturer which embody only such features as static load carrying ability, oil and sun resistance, 2000-mile life, and speeds up to 20 miles per hour with traction speeds up to 40 feet per minute. We now must overtire our equipment with tires having features we have no use for.
7. A rubber-like material which would retain its properties at temperatures of 500° F.
8. A process to reclaim synthetic rubber such as neoprene, "Thiokol," etc.
9. One of the greatest developments in the progress of the rubber manufacturing industry was the application of carbon black obtained by allowing the flame of burning natural gas to impinge against a cold metal surface. We would like a white, powdered material with approximately the same degree of fineness and the same reenforcing effect on rubber. This would be a distinct contribution to the advancement of the rubber industry.
10. In the manufacture of molded and extruded rubber products, many fillers are used, including limestone, clay, mineral earth, and woodflour. We need a good gravity reenforcing pigment, preferably light in color, that will deliver at 1¼¢ per pound. The tonnage is large, our consumption alone in 1939 having been over 12,000,000 pounds.
11. An economical process of removing sulphur from vulcanized rubber which would leave the scrap as it was before vulcanization.
12. Material to be added to a rubber mix to reduce the diffusion of air through the rubber.

Information pertinent to the above 12 points is desired by the Research Advisory Service so that it can pass the information along to the one who originally suggested the problem. INDIA RUBBER WORLD will be glad to forward all such data to the R.A.S.

The Research Advisory Service was established through the voluntary cooperation of more than 800 industrial research laboratories to enable manufacturers to find answers to their problems and is maintained in a large measure by a number of banks. The service does not undertake research work of its own, but refers problems to the various cooperating laboratories.

Additional Census Data

United States Department of Commerce, Bureau of the Census, Washington, D. C., in a recent release, "Retail Trade—the United States—1939, Preliminary Summary," reports that in 1939 there were 18,525 stores dealing in automobile accessories, tires, and batteries, against 14,343 in 1935 and 22,313 in 1929. Sales for 1939 totaled $523,685,000, 40% above the $373,910,000 for 1935, but 13% below the $599,295,000 for 1929.

The preliminary report, "Special Industry Machinery," shows that in 1939 U. S. factories produced rubber working machinery valued at $13,684,121, compared with the 1937 figure of $12,271,090.

The "Plastic Materials" preliminary report includes synthetic rubber and rubber substitutes. In 1939 the total value of plastics materials turned out was $79,752,810, contrasted with $61,877,690 two years before. The production of plastics and synthetic resins other than nitrocellulose, cellulose acetate, and coal-tar resins, but including photographic film base, ethyl cellulose, synthetic rubber, and rubber substitutes, rose from $13,568,113 in 1937 to $30,039,151 in 1939.

CALENDAR

Jan. 6-10.	SAE Annual Meeting. Detroit.
Jan. 10.	Perkin Medal Award. Chemists' Club, New York.
Jan. 23.	Ontario Rubber Section. University of Toronto.
Jan. 24.	Akron Rubber Group, Akron City Club.
Feb. 4.	Los Angeles Rubber Group, Mayfair Hotel.
Mar. 3-7.	A. S. T. M. Committee Week and Spring Meeting, Mayflower Hotel, Washington, D. C.
Mar. 7.	Nichols Medal Award. Chemists' Club, New York.
Apr. 1-3.	A.S.M.E. Spring Meeting. Atlanta, Ga.

The National Power Show

The Fourteenth National Exposition of Power and Mechanical Engineering was held in Grand Central Palace, New York, N. Y., December 2-7. More than 290 exhibitors displayed products of research and invention including electrical, transmission, and steam plant apparatus, piping, joints, flexible metal hose and tubing, valves, packings, recording instruments, belting, machines, metals, and tools.

Among the exhibits of rubber products were: L. H. Gilmer Co., Tacony, Philadelphia, Pa., featuring its new "Hevaloid" endless belting; American Steel & Wire Co., Chicago, Ill., displaying high-voltage cable with a conductive rubber sheath that minimizes corona formation; Garlock Packing Co., Palmyra, N. Y., featuring packings and the "Klozure" oil seal of metal and nonporous rubber; and La Favorite Rubber Mfg. Co., Paterson, N. J., showing printing rolls, acid buckets, extruded and molded goods, and rubber bonded by special process to metal. The Dayton Rubber Mfg. Co., Dayton, O., had an extensive belt display including synthetic and natural rubber V-belts under comparative test in an oil bath. The Gates Rubber Co., Denver, Colo., exhibited Gates Vulco Ropes for endless belt installations, other belting, hose, and tank linings. Habirshaw Cable and Wire Division of the Phelps Dodge Copper Products Corp., New York, N. Y., had a large showing of wires and cables, and movies of the laying of a submarine cable. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., featured neoprene and its application in industrial, chemical, and domestic products.

The Bristol Co., Waterbury, Conn., exhibited recent developments in round-chart potentiometers and thermometers; the Free-Vane control as used in the operation of the firm's air-operated controllers; and telemetering systems. Cambridge Instrument Co., New York, displayed moisture indicators, pH meters and recorders, and CO_2 and O_2 indicating and recording instruments, together with the firm's combination needle, roll surface, and mold pyrometer. Taylor Instrument Cos., Rochester, N. Y., exhibited a representative collection of their "Fulscope" recording and indicating instruments, the "Flex-O-Timer" and Self Acting temperature controller. Barco Mfg. Co., Chicago, demonstrated swivel joints for use in hydraulic presses, calenders, and mills. The Yarnall-Waring Co., Philadelphia, manufacturer of hydraulic valves, also were represented in the Power Show with an exhibit of steam traps, water columns, and blow-off valves.

U. S. Rubber Elects

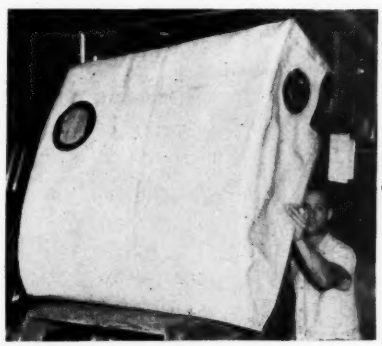
The United States Rubber Co., 1230 Sixth Ave., New York, N. Y., through President F. B. Davis, Jr., announced the election last month of Medley G. B. Whelpley, of Guggenheim Bros., as a director of the rubber company.

Arthur Surkamp

Mr. Davis on December 19 reported the election, at a special meeting of the board, of Arthur Surkamp as treasurer of the company. Mr. Surkamp, who has been comptroller of U. S. Rubber since 1929, was born in St. Louis, Mo., 47 years ago and graduated from the University of Texas with both academic and law degrees. Prior to a year of graduate work in business administration at Harvard University, he practiced law in San Antonio, Tex., for two years, and later worked a year for the Pennsylvania Railroad. He joined the rubber company as employment manager in 1919 and later was appointed assistant treasurer of United States Rubber Plantations, Inc. During a subsequent year spent on the company's properties in Sumatra and British Malaya, he devised and installed a system of rubber plantation accounting, a system still in use out there.

Sherwood S. Green was elected general assistant treasurer. Mr. Green, who came to the company in 1917, has been assistant treasurer since 1920. He has also recently been acting managing director of the Plantation Division and in his financial capacity has been largely concerned with foreign aspects of the company's business, including the problems of foreign exchange.

Elected to three new posts as assistant treasurer of U. S. Rubber are Alva F. Myers, Walter C. Reich, and Henry A. Steinmetz. Herbert M. Kelton was appointed to the new post of general auditor. All, formerly assistant comptrollers, have been with the company for from 10 to 35 years. In combining the treasury and accounting activities under the treasurer, the offices of comptroller and assistant comptrollers were not filled.



Installing U. S. Rubber Bullet-Sealing Gas Tank in a Douglas Bomber

Personnel Mention

Leonard E. Best has been named assistant development manager in charge of new products of the company's mechanical goods division in Passaic, N. J., according to R. D. Gartrell, development manager. Mr. Best's main job will be to extend and improve the coordination between the needs of industry and the development facilities of the division. Mr. Best entered the rubber industry shortly after his graduation from Massachusetts Institute of Technology nearly a quarter-century ago and was associated with U. S. Rubber's mechanical goods division for several years prior to 1935.

Cyrus S. Ching, national director of industrial and public relations of U. S. Rubber, was the principal speaker at the second of the 1940-41 series of industrial assemblies of the Providence Y.M.C.A. on December 5. Among the committee in charge of arranging the series are J. Roland Brogden, industrial relations manager of the company's plant at Providence, R. I., and James Heatherington, of Anaconda Wire & Cable Co.

Bullet-Sealing Airplane Gasoline Tanks

One of the first officially released photographs of the bullet-sealing gasoline tanks for airplanes, developed by U. S. Rubber, is shown here. The tank illustrated is being installed in a bomber under construction in a California plant of Douglas Aircraft Co. and is one of a large quantity already delivered for installation in both American and British war planes, according to Mr. Davis. Penetration of this type of bullet-sealing tank by the usual calibre machine-gun bullets is not followed by disastrous fuel leaks and resultant fires.

Several hundred bombers and fighters for both air forces are already being equipped with this type of tank. In addition the company has nearly completed delivery of a very large order to the British of the material in sheet form for installation in planes in England.

Du Pont Fellowships

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for the academic year 1941-42 has awarded six post-doctorate fellowships, at $2,000 each, for research in organic chemistry and twenty post-graduate fellowships, at $750 each, for research in chemistry and thus will also benefit twenty universities.

Du Pont has announced that attendance at the Wonder World of Chemistry, its exhibit at the 1940 World's Fair in New York, totaled 4,371,227, against 5,363,211 visitors in 1939. This year's figure constituted slightly more than 23% of the total Fair visitors.

New York Rubber Goes Back 90 Years

Laying claim to being the second oldest manufacturer of mechanical goods in the United States, the New York Rubber Corp., Beacon, N. Y., will celebrate its ninetieth birthday this year. The predecessor of the present firm, the New York Rubber Co., was incorporated under the laws of New York State on August 9, 1851, by John Greacean, Jr., Benjamin Franklin Lee, and Charles Dutch. The factory was originally on Staten Island with offices and warehouse at 84 Reade St., New York, N. Y. Soon after the Civil War, manufacturing was moved to a plant 60 miles up the Hudson River to Mattawan (now called Beacon), where water power was available from Fishkill Creek.

In 1858 a William H. Achen became connected with the company. Within ten years he became treasurer and in 1883 succeeded to the presidency, an office which he held until his death January 11, 1906. The office was then filled by J. P. Rider, who had been successively secretary and vice president of the firm. Mr. Rider continued as chief executive until 1911, when he resigned because of advancing years, and was succeeded by John Achen, son of the former president. In June, 1927, the present New York Rubber Corp. reorganized and succeeded the New York Rubber Co., the new control having no connection whatsoever with the previous ownership.

In the early days the firm pioneered not only in mechanical goods, but also in other diversified lines, particularly toys. It is reported that back in 1890 the company was the only manufacturer of tennis balls in the United States. In 1898 the largest grain elevator in England was erected by a Chicago firm, and New York Rubber conveyer belts were used throughout—7,436 feet of belt weighing 39,683 pounds, even today a sizable order. Today the company continues to specialize in mechanical goods, particularly belt, hose, and packing, but the rubber toy business, now discontinued these many years, has been replaced by the present line of inflatable goods.

The firm has always pointed with pride to the length of service of its employes and officials and to the fact that its craftsmen were succeeded by sons and grandsons. At one time 13 men represented 324 years of combined service. This tradition is followed to the present time as evidenced by the present Twenty Year Club, whose membership comprises nearly half the present employes.

Linear Packing & Rubber Co., Inc., manufacturer of mechanical packings, State Road and Levick St., Tacony, Philadelphia, Pa., according to President A. W Swartz, is putting up a new two-story addition to increase floor space one-third, a move necessitated by the large increase in the mechanical packing industry due to the national defense program, in which Linear is cooperating in every possible manner.

Contractors' Obligations under Unemployment Insurance Law

All employers who claim they are not liable for contributions under the New York State Unemployment Insurance Law on wages paid for work performed under contract, because the contractor's agreement renders another person or persons subject to the law, must submit copies of such agreements to the Division of Placement and Unemployment Insurance and certify the name of each person who is party to the contract, it was announced December 4 by Industrial Commissioner Frieda S. Miller.

This regulation of the Industrial Commissioner, effective immediately, states that these certifications and copies of the agreements must be filed between the first and tenth of the month following the current calendar quarter, "or following the calendar quarter during which the person claiming not to be liable for contributions agreed for the first time to contract for such work under such agreement, whichever is the later."

Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn, N. Y., is offering two graduate courses dealing specifically with rubber: G 135, Polymeric Organic Compounds, in which the synthesis and structure of organic substances of high molecular weight, including natural and synthetic rubber, balata, gutta percha, and resins, are considered, covering such points as polymerization, condensation, association, aggregation, and micell formation; and G 152, Chemistry of Rubber and Synthetic High Polymers, in which natural rubber, its production, chemical and physical behavior and synthetic products of rubber- and resin-like behavior are discussed.

The Thermoid Co., Trenton, N. J., is working on a full capacity basis. On December 27 the concern gave a Christmas party at the plant cafeteria for its employes' children. A large tree and gifts for all were main attractions. The firm's office help held their affair at Geneva Inn, near Lawrenceville, N. J. Russell W. Case, company executive, was on a business trip to Chicago and points west.

Webster Norris, retired technical editor of INDIA RUBBER WORLD, with his wife is again spending the winter in Florida. The mailing address is P.O. Box 2975, St. Petersburg, Fla.

The Pocono Co., Trenton, N. J., acquired by the National Automotive Fibres Corp., Detroit, Mich., a few months ago, has been dissolved, according to papers filed recently in the office of the Secretary of State of New Jersey. The National company is operating with a full force.

Dr. Peter Fireman, for many years president of the old Lambertville Rubber Co., Lambertville, N. J., is ill in Charles Private Hospital, Trenton, N. J.

Rubber Important in Synthetic Phenol Plant

Rubber plays a major role in the operation of the new plant of Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y., said to be the largest of its kind in the world for the production of synthetic phenol, according to The B. F. Goodrich Co., Akron, O., supplier of much of the rubber used.

The plant has 21 tanks lined with rubber by Goodrich, using 8,057 square feet of rubber lining. The average per tank is 387 square feet. Largest of these tanks is the one for storing hydrochloric, 10 feet in diameter and 20 feet long, with 800 square feet of rubber lining. The smallest is a "distributer" tank 32 inches in diameter and two feet, three inches deep with 34 square feet of rubber lining.

Besides some of the pipe and ells and the cover, mixing shaft, and propellers on one of the agitators are rubber lined, and 20,200 rubber bands of various sizes are utilized.

The new plant, with a capacity of 15,000,000 pounds of synthetic phenol annually, uses the Raschig process, a catalytic vapor-phase system for the chlorination of benzene and the hydrolysis with steam of the chlorobenzene produced. In many of the operations rubber linings have to be employed to protect metal against deteriorating action of chemicals and gases.

Revertex Corporation of America, One Main St., Brooklyn, N. Y., on December 20 moved its offices, laboratory, and compounding plant to larger quarters at 37-08 Northern Blvd., Long Island City, N. Y.

L. Albert & Son, dealer in rubber machinery, reports that 50% of its export business is now with South America. Officials state the Trenton, N. J., Akron, O., and Los Angeles, Calif., plants are operating to capacity.

The New York City Board of Transportation on November 28 acquired five more new streamlined aluminum subway cars with rubber springing and steel and rubber wheels to eliminate noise. A similar car was put into experimental service on the B. M. T. line in March, 1939. These cars were the outgrowth of experiments conducted by The B. F. Goodrich Co., the Aluminum Co. of America, and the Clark Equipment Co.

Precision Roll & Rubber Co., Inc., 4397 South Broad St., Yardville, N. J., manufactures rubber-covered rolls for the textile and leather industry, molded specialties, and synthetic goods. The officers are: T. D. Dantzler, president; Egbert L. Wright, vice president; Robert Spreat, treasurer, and Donald Fred, secretary.

John A. Roebling's Sons Co., Trenton, N. J., has made Roger H. Clapp assistant general manager of sales. He was formerly in Philadelphia.

Hewitt Rubber Corp., Buffalo, N. Y., on December 19 announced its annual distribution of year-end bonuses to employes and special year-end dividend to stockholders. The bonus provided two weeks' wages to workers with the company ten years or longer, which group represents about one-half the total force. Others with shorter terms of employment received smaller amounts in proportion to their length of service. President Thomas Robins, Jr., stated that during 1940 the company completed a plant expansion and improvement program costing $325,000, all of which was financed from earnings of the past two years. He further declared that the management believes the company is now well equipped to handle the substantial and growing business which is already making itself felt as a result of the national defense program and is expected to show further increase after the first of the year.

Essex Rubber Co., Trenton, N. J., reports that indications point to a good winter and early spring trade, with a better volume of business than experienced a year ago. The firm had a display of heels and soles at the annual Shoe Manufacturers' Exhibition held last month at the Hotel Statler, Boston, Mass., at which it was represented by L. M. Oakley.

Nickerson Tire Cord Process to Be Offered on Equal Basis

The National Cotton Council, Memphis, Tenn., informs us that all tire and tire cord manufacturers will be offered equal opportunities to take advantage of the Nickerson tire cord process, discussed briefly on page 38 of our October issue, as soon as patent action has been obtained on this development. Shortly after the discovery of the process some two years ago, the Cotton Research Foundation, research agency of the Council, entered into a contract with the Firestone Tire & Rubber Co., Akron, O., whereby this company would conduct the laboratory and field tests necessary to the full commercial development of the process. Firestone's present status in regard to this development is summed up in the following statement by T. E. Pittenger, factory manager of that firm, to the Council on November 29, 1940:

"Relative to our previous correspondence, this is to advise you that Firestone is not using on a commercial scale in any of its factories a process following the specific teachings of any of the Nickerson processes for tire cord manufacture. The work that we have done in accordance with our agreement with the Cotton Research Foundation has been confined strictly to a development and testing program, which we are actively continuing.

"For the present, we do not contemplate carrying out tire cord manufacture according to the Nickerson teachings on a commercial scale, and before doing so we will, of course, advise your organization."

Java Research Head Visits U. S.

Dr. G. M. Kraay, head of the Rubber Research Department of the Proefstation, West Java at Buitenzorg, Java, is planning on returning to Java by airplane at the end of January after a visit of 2½ months in this country. Dr. Kraay and his staff of seven graduate chemists, four European analysts, and 20 Javanese assistants are engaged in the study of the fundamental properties of latex and rubber with a view to the development of wider and more specialized applications of rubber. The Department of Rubber Research, whose jurisdiction extends over all of the Netherlands East Indies, together with the British Rubber Producers Research Association in London and similar units in Holland and France, was established under the International Rubber Regulation Scheme and is organized under the International Rubber Research Board in London.

Dr. Kraay's purpose in visiting this country was to obtain first-hand information as to the desires of the research department of the rubber consumers relating to latex and rubber in order to conduct his research work so as to obtain results which may be of the greatest usefulness to the rubber consumers. Dr. Kraay speaks highly of the friendly way in which he was received in this country and of the cooperation received from the rubber manufacturers which has helped to make his mission a success. He states with great satisfaction that the research work carried out by the rubber manufacturers in this country has contributed in a very large degree to the development of new uses of rubber, thus helping in their own way the rubber producers.

Supply Contracts Awarded

Among recent listings of contracts awarded by various departments of the United States Government appear the following:

NAVY: *asbestos felt,* Union Asbestos & Rubber Co., Cicero, Ill., $51,750; *cable,* General Cable Corp., New York, N. Y., $97,564, General Electric Co., Schenectady, N. Y., $98,685, Habirshaw Cable & Wire Division of Phelps Dodge Copper Products Corp., New York, $163,504, Okonite Co., Passaic, N. J., $97,760; *cotton canvas,* Mt. Vernon Woodberry Mills, Inc., Baltimore, Md., $108,992; *cotton duck,* Wellington Sears Co., Lanett, Ala., $55,580; *cotton for powder,* Hercules Powder Co., Wilmington, Del., $527,303; *hose,* United States Rubber Co., New York, $15,816; *nitrate strontium,* E. I. du Pont de Nemours & Co., Inc., Wilmington $7,848; *rubber bands,* Survbest Co., Inc., New York, $14,224; *shoe pacs,* Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., $20,790; *tape,* du Pont, $12,468.33; *wire,* Collyer Insulated Wire Co., Pawtucket, R. I., $200,500, Habirshaw, $196,300.80.

TREASURY: *tires and tubes,* Armstrong Rubber Co., Inc., West Haven, Conn., Cooper Corp., Findlay, O., Dayton Rubber Mfg. Co., Dayton, O., Dunlop Tire & Rubber Corp., Buffalo, N. Y., Falls Tire & Rubber Co., Findlay, Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Co., Goodyear Tire & Rubber Co., all of Akron, O., Kelly-Springfield, Tire Co., Cumberland, Md., Lee Rubber & Tire Corp., Conshohocken, Pa., Mansfield Tire & Rubber Co., Mansfield, O., Mohawk Rubber Co., Akron, Pennsylvania Rubber Co., Inc., Jeannette, Pa., Seiberling Rubber Co., Akron, U. S. Rubber, and Waber Co., Chicago, Ill.

WAR: *ammunition components,* American Cyanamid & Chemical Corp., New York, $15,134; *boots,* Goodyear Footwear Corp., Providence, $11,808, Hood Rubber Co., Inc., Watertown, Mass., $39,210, Tyer Rubber Co., Andover, Mass., $9,900, U. S. Rubber, $85,852; *cloth,* Turner Halsey Co., New York; *cotton duck,* Wellington Sears, $10,175; *forging dies,* United Shoe Machinery Corp., Beverly, Mass., $1,212; *inner tubes,* Firestone, $20,301, General Tire, $5,324, Goodyear Tire, $47,951; *jackets,* Badger Raincoat Co., Port Washington, Wis., $14,925; *mosquito bars,* A. B. C. Rubber Specialty Co., Brooklyn, N. Y., $12,500; *raincoats,* Archer Rubber Co., Milford, Mass., $218,266, Cable Raincoat Co., Boston, Mass., $612,636, Cambridge Rubber Co., Cambridge, Mass. $191,508, Sigmund Eisner Co., Red Bank, N. J., $221,278, Interstate Mfg. Co., Ashland, Mass., $63,132, King Kard Overall Co., Philadelphia, Pa., $158,901, Marathon Rubber Products Co., Wausau, Wis., $430,835, U. S. Rubber, $1,027,000; *rubber sheeting,* Vulcan Proofing Co., Inc., Brooklyn, $9,947.22; *small arms material* Firestone, $3,986,340; *surgical supplies,* Seamless Rubber Co., New Haven, Conn., $7,090.05; *tires,* Goodrich; *tires and tubes,* U. S. Rubber, $31,578; *tracks,* Goodrich $5,780,100, Goodyear Tire, $17,500.

New Showrooms Opened for Korosealed Fabric Products

On December 19, Comprehensive Fabrics, Inc., formerly at 31 W. 27th St., New York, N. Y., and organized in November, 1939, to handle the licensing and national distribution of Korosealed fabrics, celebrated the opening of new showrooms in the Empire State Bldg., 34th St. and Fifth Ave., New York. At a luncheon following the inspection of the display by over 100 retail and department store executives, Joseph A Kaplan, president of Comprehensive Fabrics, introduced as the first speaker John L. Collyer, president of The B. F. Goodrich Co., who was followed by Dr. Howard E. Fritz, head of Goodrich's Koroseal Division. A feature of the talks was the emphasis placed upon the desirability of training retail sales personnel as to the utility of the articles as well as the eye-appeal so that the consumer may be told more about the properties of the material.

Among the products made of Korosealed fabrics which were on exhibition at the opening were: baby pants and bibs; blanket and bathing bags; bowl covers and refrigerator bags; drapery fabrics, bathroom window drapes, and shower curtains and caps; garment bags and protectors; golf and sports jackets; gloves, hampers; boxes for handker-

chiefs, gloves, hats, shoes, hosiery and jewelry; luggage linings; make-up and shampoo capes; mattress covers and tickings; narrow fabrics; non-allergic covers; pillow covers; raincapes and raincoats; sewing boxes; storage covers for chinaware, pillows, blankets, linen, etc.; table cloths; tobacco pouches; umbrellas; upholstery fabrics; and waste-paper baskets.

Eleven concerns, each covering a distinct line of products, have been licensed by Comprehensive Fabrics, Inc., to manufacture and distribute the above listed products made from Korosealtreated fabrics. Mr. Kaplan disclosed that sales of Korosealed fabrics in 1940 had exceeded the expectations by 400%.

Rubber Cement Output Up

The Bureau of Census, Washington, D. C., in giving the production of rubber cement in 1939 at 19,605,464 gallons, value $10,055,115, against 15,447,489 gallons in 1937, 5,970,854 gallons in 1935, and an average of 4,990,545 gallons in the four preceding census years, attributes the gain to large-scale industrial outputs, particularly for tire retreading and leather footwear.

The former, a development to some extent superseding the earlier garage business in tire repairs, has assumed large proportions only since about 1933, and in 1937 the Census Bureau first reported the production of camelback for tire retreading, at 34,126,448 pounds; in 1939, at 54,223,474 pounds.

The greatly increased use of rubber cement also followed the adoption of the cement process in shoe manufacture, especially women's, in 1931, when production of such footwear was 10,913,350 pairs, to rise to 40,061,283 in 1933, to 59,899,565 in 1935, and to 93,539,304 pairs in 1937. Figures for 1939 are not yet available.

The sale of rubber cement in small tubes for household general repairs and in bulk for ordinary tire repair work still constitutes an important outlet.

Puritan Rubber Co., Trenton, N. J., is operating to capacity, and company officials expect the increase in business to continue through the winter and early spring.

Whitehead Bros. Rubber Co., and its affiliate, The Goodall Rubber Co., both of Trenton, N. J., have established a pension plan applicable to employes retiring at the age of 65. The companies will pay for the time covered by their services until the time when the plan was placed into effect on December 1, and the companies and employes will jointly contribute to what is termed future payments. The plan, taken out with a life insurance company, has been received with much enthusiasm by the workers.

William J. B. Stokes, 2d, president of the Jos. Stokes Rubber Co., Trenton, N. J., and Mrs. Stokes spent some time at Welland, Ont., Canada.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., has announced that the sale of chemical products which it manufactures will, in future, be handled by the company's Columbia Chemical Division, 30 Rockefeller Plaza, New York, N. Y. Previously, sale of such chemicals as soda ash, caustic soda, and chlorine was conducted through The Columbia Alkali Corp., a wholly owned sales division. This action does not affect the personnel or sales organization. Customers will merely purchase direct from the Columbia Chemical Division rather than through a wholly owned sales corporation as they have in the past. Eli Winkler, executive sales manager, and W. I. Galliher, director of sales, will retain their respective positions. The status of existing contracts of The Columbia Alkali Corp. and existing distributer relations will not be affected by the change.

Pierce-Roberts Rubber Co., Trenton, N. J., continues busy. President Harry W. Roberts has returned to his desk after an illness.

Nearpara Rubber Co., Trenton, N. J., on December 15 suffered the loss by a fire of undetermined origin of a storage building 60 by 150 feet used for reclaimed rubber and another structure 12 by 130 feet used for finished products. Company officials said the blaze would not interfere with plant operations.

The Rubber Manufacturers Association of New Jersey on December 17 held its annual meeting at the Trenton Club, Trenton, N. J., when George T. Gretton, of the Asbestos Fibre & Rubber Co., was elected president, succeeding A. Boyd Cornell, of the Hamilton Rubber Co. Herbert South, of the same company, was named vice president to succeed Lloyd Leaver, also of Hamilton, J. Edward Myers, of Acme Rubber Mfg. Co., succeeds Charles E. Stokes, Jr., of Home Rubber Co., as secretary, and Horace B. Tobin, formerly with Woven Steel Hose & Rubber Co., was reelected treasurer.

Vulcanized Rubber Co., Morrisville, Pa., has renewed its working agreement with its employes under the same conditions as prevailed last year. The company reports business as much better than at this time a year ago.

United States Department of Commerce, Washington, D. C., through E. G. Holt, chief, Leather and Rubber Division, has announced that P. W. Barker resigned from the Division on November 16 to accept a position in the War Department in the Economic Analysis Section under Colonel Ayres. Mr. Barker's excellent publications ("Rubber History, Production and Manufacture," "Rubber Statistics 1900-1937," etc.) are widely used and highly appreciated in the rubber industry, which he has been serving for so many years. His many friends wish him an enlarged opportunity for service and advancement in his new field.

OHIO

Goodyear News

The Goodyear Tire Repair School, in operation a quarter-century, recently acquired 21 new pupils—men assigned to it by the United States government as part of its program to secure trained men in the various trades for the army. Eight of the enrollees will specialize in battery repair. The eight-week course began on December 9. The school performed a similar service during the World War and is operated by the Goodyear Tire & Rubber Co., Akron.

Price Speaks to P.A.A.

George E. Price, Goodyear purchasing agent and president of the National Association of Purchasing Agents, recently addressed the monthly dinner of the Purchasing Agents' Association of Eastern New York at the Ten Eyck Hotel, Albany. He believes prices will remain fairly steady through government control although some rise is to be expected.

Goodyear Tires for Pan-American Highway Exposition

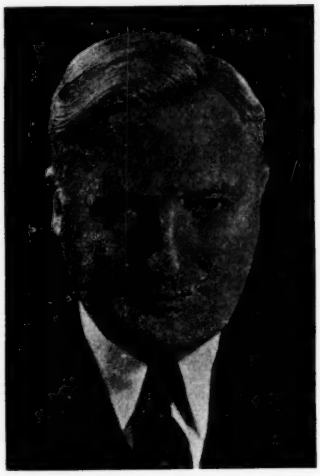
Late in November the Richardson Pan-American Highway Exposition began in Detroit, Mich., an eight-month 28,000-mile automobile trip to follow the trail of the proposed Pan-American Highway. Crossing the border of Mexico at Nogales, the expedition will visit Mexico City, San Salvadore, Managua, and San Jose, then on to Panama, across the isthmus to Bogota, Colombia, Quito, Ecuador, Lima, Peru, Santiago, Chile, then across the continent to Buenos Aires, Argentina, and on down the East Coast to the Cape. Enroute the tour will make colored motion pictures of all that may interest the motoring tourist of the future.

The white Plymouth sedan, with its colorful insignia of draped flags of nations of both Americas and a map designating the 15 countries through which the expedition will travel, is equipped with Goodyear All-Weather tires. Besides the usual tire equipment on Plymouths the expedition has a roof rack upon which two additional spare Goodyear tires will be carried.

Hycar Available in 25-Pound Samples

In connection with a new bulletin listing a few of the general properties of HYCAR O.R. (Oil Resistant), we have been informed that at this time Hydrocarbon Chemical & Rubber Co., Akron, cannot offer this product for general distribution as the entire production until some time after February 1, 1941, has been requested for defense purposes.

Hydrocarbon Chemical & Rubber Co. states that in the interim it is extremely desirous of cooperating with the research departments of the rubber industry and has withheld a limited amount for sale in lots not to exceed 25 pounds to permit obtaining preliminary experience in the processing of this product.



John W. Thomas

Firestone Increases Crude Rubber Output in Liberia

Firestone Tire & Rubber Co., Akron, in an effort to secure an independent supply of crude rubber is planning on greater output of crude rubber from its plantation in Liberia, West Africa. Exports for 1939, which were almost twice those of the previous year, totaled approximately 6,000 long tons of rubber, nearly all in the form of concentrated latex and crepe, and it is expected that this figure will be 50% higher for 1940.

Preparing for further development of the plantations, Firestone is installing the first section of a new 3,000-kilowatt power plant, which will start functioning this year and be used only for operation of crude rubber processing machinery. The present hydro-electric plant releases more than one-quarter of its current for residential lighting.

In 1927, Firestone acquired one million acres in Liberia under a 99-year lease for plantation purposes. Now about 70,000 acres are planted with rubber trees; about half are in production.

Also Firestone is steadily producing more synthetic rubber and is now building a new plant in Akron for production of the synthetic material.

Firestone President

On January 19, 1908, Harvey S. Firestone, founder and president of The Firestone Tire & Rubber Co., Akron, O., seeking the services of a chemist to organize a laboratory in his plant, sent for a young man of whom he had heard. Today that man, John Webster Thomas, is president of the company, a position he has held since 1932. After Mr. Firestone had hired him as chief chemist, Mr. Thomas established the laboratory and chemistry control; then for more than a year he was in charge of the wash lines, mills, and calenders on the night shift. In 1911 he became superintendent and in 1918 was elected a director. Three years later the title vice president was added to his name, and he assumed also the duties of general manager. He was made president in 1932.

During the World War, Mr. Thomas was chairman of the solid tire division of the War Service Committee of the Rubber Industry of the U.S.A. and during the NRA was a member of the tire code authority.

Mr. Thomas was born on a farm in Tallmadge, O., on November 18, 1880. The hard-working farm lad attended Tallmadge Township School, won a scholarship to Buchtel Academy, Akron, and graduated (1900) into Buchtel College (now Akron University). He was one of the class of eight to graduate in 1904, a Bachelor of Philosophy. Today he is chairman of the board of Akron University. Mr. Thomas is also a director of Akron City Hospital.

This executive finds relaxation in golf and belongs to Portage Country, Turkeyfoot Country, Akron University, and Akron City clubs, Lone Star Fraternity, Ohio Society of New York, and the Congregational Church.

He is married and has two sons and three daughters, two of whom are twins. His home is at 117 Edgerton Rd., Akron, O.

Goodrich Boosts Latex Sponge Output by 400%

A new production unit which increases by 400% the output of Air-Cell latex sponge cushioning material for national defense and industrial uses has been installed in the Akron plant of The B. F. Goodrich Co., reported J. H. Connors, vice president in charge of the company's mechanical division. A compact installation pours the latex and other ingredients into mixing tanks and molds; while automatic conveyers carry it through vulcanizers, and through washing, drying, and special finishing processes.

The new unit is the second to be installed by Goodrich since new methods of processing and finishing were developed; production was increased 300% in 1939 to meet heavy needs attributable to railway modernization and automotive buying.

In addition to cushioning uses, forms of sponge latex are finding new uses in the mass molding of airplane body parts and are also being applied to sleeping bags and other portable military equipment, Mr. Connors said.

Personnel Changes

Chairman David M. Goodrich announced that at a meeting of the board on December 17, L. L. Smith was elected treasurer of the company and Col. A. A. Sprague was reelected a director. Mr. Smith, assistant treasurer since 1920, was born in 1887 at Copley, O., and educated at schools in Bath, O., and business college in Akron. Then he joined Goodrich 32 years ago as a tire adjuster. Soon after, he was made assistant manager of the Kansas City district. After several years as sales supervisor Mr. Smith was transferred to Akron in 1915 as a credit man and became general credit manager three years later.

Vice President George W. Vaught, treasurer since July 1, will continue as vice president.

P. E. Tobin, of the Goodrich manufacturers' sales staff in Detroit, Mich., was elected to the directorate of the Trailer Manufacturers Association, according to Wilbur Schult, Association president.

Arthur W. Carpenter, manager of the Goodrich testing laboratories, recently was appointed to Committee E-9 on Research of the American Society for Testing Materials for a five-year term.

Goodrich now has 2656 employes on its payrolls who have had more than 20 years of service, while 325 others in the same classification are on the company's list of retired workers. Of these active employes, two have been with the company more than 50 years, 26 more than 40 years, 280 more than 30, and 2,348 more than 20 years.

George A. Gear, of the sales division of the General Tire & Rubber Co., Akron, recently was elected president of the Mercator Club, Akron. Mr. Gear is past secretary and treasurer of the General Employes' Ten-Year Service Club, and also belongs to the local junior Chamber of Commerce and the Akron City Club.

These Vehicles Equipped with Goodrich Silvertown Smooth Tires, 7.50-15 Size and Four-Ply, Are Displacing the Ponderous Iron Road Roller in Some Types of Service. Road Rolling with These Tires Has Proved to Be the Best Method of Obtaining the Equivalent Action of Heavy Traffic Compaction on Road Mix and Rock Asphalt Surfaces, It Is Claimed

The Timken Roller Bearing Co. has undertaken a $3,000,000 expansion program, to meet defense requirements, at its four plants, at Canton, Columbus, Gambrinus, and Mt. Vernon. Immediate appropriations total $2,217,400, with the balance scheduled for future projects.

NEW ENGLAND

Survey on Value of Rubber Test Methods

During the second week of October, 1940, Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., mailed a dual questionnaire on the merit of laboratory measurements in the evaluation of three physical properties of rubber: heat generation, plasticity, and abrasion resistance. While anonymity of individual opinion was maintained, an opportunity was provided for determining the source of the composite opinion. The classified origin of the replies was:

A. Chiefs of technical departments (chief chemists, directors of research, managers, etc.)	32%
B. Owners, officers, factory managers, and superintendents	17%
C. Assistant chief chemists, sub-managers, or managers of subordinate departments	14%
D. Chemists or engineers	37%

The answer to question No. 1: "Have you found any test of this property useful?" were as follows:

	Yes	No	Doubtful	Unanswered
A. Heat generation	63%	23%	0%	14%
B. Plasticity	92%	0%	3%	5%
C. Abrasion resistance	57%	14%	20%	9%

Question No. 2 was: "Which of the known methods of testing this property do you believe to be most valuable?" Because trade names were involved, the answers cannot be disclosed, except for the following general comments regarding plasticity. Among tread stock manufacturers plasticity tests which shear the stock during test are preferred in the ratio of about two-to-one. Among other rubber manufacturers, plasticity tests which do not shear the stock during the test are preferred in about the same ratio. However the overall results indicated that opinion was fairly evenly divided between these two types of tests.

The answers to question No. 3: "Do you regularly employ this test for control or research purposes?" indicated the following:

A. Heat generation tests are used principally for research, and occasionally for control as well, but rarely ever for control alone.

B. Plasticity tests are used generally for both control and research.

C. Abrasion resistance tests are used primarily for research, although a large number of concerns use the test for both control and research. It is rarely used for control alone.

The most interesting phase of the replies to the question on abrasion resistance was the large number who qualified their answer. It is quite probable that many of those who replied in the affirmative had inward qualifications which they did not express on the questionnaire. The value of abrasion resistance laboratory tests apparently remains a very open question.

Firestone Plant Inspected

Firestone Rubber & Latex Products Co., Fall River, Mass., on December 6 was inspected by John W. Thomas, president of the Firestone Tire & Rubber Co., Akron, O., accompanied by Vice President Harvey S. Firestone, Jr., Russell A. Firestone, John J. Shea, Bernard M. Robinson, Stacy C. Carkhuff, Hervey H. Holliger, and Harris Creech, all directors of the parent concern. The visitors along with department heads of the Fall River unit were guests of Roger S. Firestone, president of the Fall River company, at a luncheon at the Quequechan Club and then left to visit the Firestone Cotton Mills in New Bedford, Mass.

Mr. Thomas believes that the Fall River plant, which is one of the fastest growing units in the Firestone worldwide organization, is very important because of the products it is manufacturing for national defense including gas masks, equipment for which was speedily installed and production efficiently organized. The diversity of products is another feature of the plant, which includes molded goods, battery bases and parts, Airtex rubber mattresses and upholstery, Controlastic thread, and gas mask parts.

Wear Rubbers and Avoid Colds

A recent issue of *Boot and Shoe Recorder,* in stating that low temperatures and wet weather often lead to colds which are a menace to the nation's welfare, physically as well as economically, reveals "that the common cold outnumbers any other disease by 25 to 1, with at least 60% of the people of the United States having more colds a year . . . there is an average loss of work of about 2½ day for each worker on account of colds, which also are the outstanding causes of absence from school. To safeguard against such illness people are urged particularly to avoid wet feet, and one means recommended is to wear rubbers or overshoes on all wet days.

The Coventry Co., Inc., successor to the Marshall Braid Co., Pawtucket, R. I., which purchased the plant formerly occupied by the Rhode Island Processing Co. at Coventry Centre, R. I., has completed the transfer of machinery to the new location, where elastic and non-elastic narrow fabrics will be manufactured. The officers of the Coventry company are: president and treasurer, G. M. Brigdan, vice-president and superintendent, H. J. Pelchat; and secretary, J. R. Brogdan.

Alec Alexander, 76-year-old foreman of the Davol Rubber Co., Providence, R. I., on December 20 was honored by his associates at a testimonial dinner in recognition of his fifty years with the company. He received an easy chair and an illuminated scroll inscribed by every member of the department and presented by John B. Charette on behalf of the guests. Ernest I. Kilcup, Davol president, was among those present. Mr. Alexander plans to continue working.

Cabot Buys Smith Bros. Gasoline Plant

Godfrey L. Cabot, Inc., carbon black manufacturer, 77 Franklin St., Boston, Mass., recently purchased, at a reported price of one million dollars, the gasoline plant of Smith Bros., at Kermit, Tex., which was constructed in 1936 and has since been blowing the residue gas, amounting to nearly thirty million cubic feet a day, into the air after extracting the gasoline. Since the Boston firm bought the plant the residue gas is being piped to Cabot's Kermit factory about three miles away and there converted into carbon black. As a result of this acquisition Cabot is now processing in its three gasoline plants and two carbon black plants in West Texas eighty million cubic feet daily of casing-head gas which would otherwise be blowing into the air at each well head in order to permit the oil within the well to come to the surface.

OBITUARY

W. R. Macdonald

WALTER RALEIGH MACDONALD, veteran rubber executive who retired in 1927, died at his home in Brooklyn, N. Y., on December 20. Among the firms with which he has been connected were the Stoughton Rubber Co., the Enterprise Rubber Co., and the Boston Rubber Shoe Co.

He was born in Grand Manan, N. B. and had lived in Boston, Mass., many years.

He leaves his wife, a daughter, and a grandson.

Philip H. Heater

AFTER a long illness Philip H. Heater, former Bucyrus, O., industrialist, passed away early last month. His long business career included managerships of the Bucyrus Rubber Co. and the Rufnacht Rubber Co.

He was born in Oceola, O., on January 27, 1873.

A bachelor, he is survived by his mother, a brother, a sister, three half-brothers, and two half-sisters.

Funeral services were held on December 3 at his late residence, and Masonic services were conducted at the grave in Oakwood Cemetery.

Wilson H. Blackwell

FOLLOWING an appendectomy, Wilson Hunt Blackwell, treasurer of the United States Rubber Co., 1230 Sixth Ave., New York, N. Y., died in a local hospital on December 7. He was born in New York 68 years ago.

After graduating from New York University, Mr. Blackwell, on July 1, 1895, joined the auditor's department of U. S. Rubber. He was made treasurer of the General Rubber Co., formed to develop plantations in the Far East, when it was organized in 1910. In 1918 the deceased was elected assistant treasurer of the parent concern and treasurer in 1919. He was also treasurer and a director of many of U. S. Rubbers' subsidiaries.

Mr. Blackwell belonged to Delta Kappa Epsilon and also served for several years as an officer of the Rubber Manufacturers Association, Inc., and of the Lotos Club.

His wife and two sisters survive him.

Funeral services were held on December 10 at St. Thomas Protestant Episcopal Church in New York, followed by private interment.

Philip Weinstein

PHILIP WEINSTEIN, president of the Atlantic Tubing & Rubber Co., Providence, R. I., which he had founded about 20 years ago, died at a hospital in Providence on December 17. He was born in Kiev, Russia, 63 years ago and was engaged in the dry goods business before turning to rubber.

He was a trustee of Temple Beth Israel, where funeral services were held on December 19, and a member of the Independent Order of Beth Abraham, the B'nai B'rith, and the Hebrew Free Loan Association.

Mr. Weinstein is survived by his wife, a daughter, and three sons.

Louis F. Body

A SUDDEN heart attack while he was on a business trip caused the death, on November 21, of Louis F. Body, sales manager of The Dill Mfg. Co., Cleveland, O. He had joined the company in 1926 after having previously been with the Sherwin-Williams Co., the Glidden Co., and the Guardian Lock Wheel Co.

Mr. Body was born in Vermilion, O., on April 12, 1882, and finished his schooling in Cleveland. He belonged to the Mayfield Country and the Hermit clubs.

Funeral services were held at the Fairmount Presbyterian Church, and burial was in Lakeview Cemetery.

Survivors include the widow and three sons.

Albert Numbers

ALBERT NUMBERS, for many years identified with the rubber industry in Trenton, N. J., succumbed to a heart attack on November 30. He was one of the organizers of the old Globe Rubber Tire Co., and one-time manager and later superintendent of the former Thermoid Rubber Co. His other connections follow: president of Reliable Tire & Rubber Co. and of the National Tire Co.; general manager of the Virginia Rubber Co., Charleston, W. Va.; and head of the Standard Cord Tire Co. Of recent years he had been engaged in the brokerage business.

Mr. Numbers had also been active in politics and belonged to the Elks.

He leaves his wife, his mother, and two sisters.

Burial was in Trenton.

FINANCIAL

Unless otherwise indicated, the results of operations of the following are after operating expenses, Federal income taxes, and other deductions. Additional tax charges under the new Revenue Act of 1940 have been made against earnings in many reports. Figures in most cases are subject to audit and final adjustments.

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiaries. Ten months to October 31: net profit, after excess profits taxes, $1,796,325, equal, after preferred dividend requirements, to $3.78 each on 444,455 shares of common stock. Net profit of the parent company, only, amounted to $1,704,385 for the ten month period.

Crown Cork and Seal, Inc., Baltimore, Md., and wholly-owned domestic subsidiaries. First nine months, 1940: net profit, after depreciation, interest, amortization, federal income taxes, and other charges, $2,059,282, equal to $3.24 each on 517,609 shares of common stock, against $1,627,549, or $2.41 a common share, in the same period of 1939.

Firestone Tire & Rubber Co., Akron, O. Year ended October 31, 1940: consolidated net profit, after providing for all expenses, including $7,281,568 for depreciation and $16,680,000 for direct taxes and after adding $1,500,000 to the reserve for contingencies, $8,652,607, equal, after preferred dividend requirements, to $3.02 a share on the 1,936,393 shares of $10 par common stock outstanding, contrasted with $6,722,046, or $2.03 a share on 1,933,992 shares of common stock in the previous fiscal year; sales, $187,209,292, against the previous record high of $160,119,022 in the preceding 12 months; current assets, $105,413,852 including cash of $13,404,800; accounts and notes receivable, less reserves of $33,316,690 and inventories of $58,692,362; current liabilities, $30,852,650; current assets the year before, $89,564,381, including $13,853,127 cash, $29,376,884 accounts and notes receivable, and $46,334,370 inventories; current liabilities for the same period, $15,113,824. In compliance with the sinking fund provisions, Firestone retired $2,700,000 of 10-year 3½% debentures and $1,200,000 of 6% cumulative preferred stock.

(*Continued on page* 81)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Com.	$2.50	Dec. 23	Dec. 13
American Hard Rubber Co.	Pfd.	$2.00 q.	Dec. 23	Dec. 10
Anaconda Wire & Cable Co.	Com.	$1.00	Dec. 16	Dec. 6
Armstrong Cork Co.	Com.	$1.00	Dec. 24	Dec. 9
Baldwin Rubber Co.	Com.	$0.125 extra	Jan. 20	Jan. 15
Baldwin Rubber Co.	Com.	$0.125 q.	Jan. 20	Jan. 15
Collyer Insulated Wire Co.	Com.	$0.50 irreg.	Dec. 28	Dec. 20
Corduroy Rubber Co.	Com.	$1.00	Dec. 20	Dec. 12
Corduroy Rubber Co.	Pt. Pfd.	$1.00	Dec. 20	Dec. 12
Crown Cork & Seal Co., Inc.	Com.	$0.50 resumed	Dec. 27	Dec. 16
Crown Cork International Corp.	"A" Pfd.	$0.10 accum.	Dec. 30	Dec. 17
Dayton Rubber Mfg. Co.	Com.	$0.25	Jan. 25	Jan. 10
Dayton Rubber Mfg. Co.	"A" Pfd.	$0.05 q.	Jan. 25	Jan. 10
DeVilbiss Co.	Com.	$1.00	Dec. 16	Nov. 30
Dunlop Tire & Rubber Goods Co., Ltd.	5% Pfd.	$0.625 s.	Dec. 31	Dec. 16
E. I. du Pont de Nemours & Co., Inc.	Pfd.	$1.125	Jan. 25	Jan. 10
E. I. du Pont de Nemours & Co., Inc.	Com.	$1.75	Dec. 14	Nov. 25
Electric Storage Battery Co.	Com.	$0.50	Dec. 23	Dec. 3
Electric Storage Battery Co.	Pfd.	$0.50	Dec. 23	Dec. 3
Endicott Johnson Corp.	Com.	$0.75	Jan. 1	Dec. 26
Endicott Johnson Corp.	Pfd.	$1.25 q.	Jan. 1	Dec. 26
Firestone Tire & Rubber Co.	Com.	$0.25	Dec. 20	Dec. 12
Flintkote Co.	Com.	$1.00	Dec. 23	Dec. 16
Garlock Packing Co.	Com.	$1.25	Dec. 24	Dec. 14
General Tire & Rubber Co.	"A" Pfd.	$1.50 q.	Dec. 31	Dec. 20
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd.	$0.625 q.	Jan. 2	Dec. 14
Hercules Powder Co.	Com.	$1.05	Dec. 20	Dec. 9
Hercules Powder Co.	Pfd.	$1.50 q.	Feb. 14	Feb. 3
Hewitt Rubber Corp.	Com.	$0.25	Dec. 30	Dec. 24
Hewitt Rubber Corp.	Com.	$0.25 special	Dec. 30	Dec. 24
Jenkins Bros.	Com.	$1.75 q.	Dec. 21	Dec. 13
Jenkins Bros.	N-v $25	$2.00	Dec. 21	Dec. 13
Jenkins Bros.	Founders Shrs.	$2.00	Dec. 21	Dec. 13
Lima Cord Sole & Heel Co.	Com.	$0.125	Dec. 20	Dec. 2
Mansfield Tire & Rubber Co.	Com.	$0.10 q.	Dec. 20	Dec. 10
Mansfield Tire & Rubber Co.	Pfd.	$0.30 q.	Jan. 2	Dec. 14
Midwest Rubber Reclaiming Co.	$4 Pfd.	$1.00 q.	Dec. 2	Nov. 20
Ohio Rubber Co.	Com.	$6.00	Dec. 11	Dec. 10
Okonite Co.	Com.	$1.00	Dec. 12	Dec. 5
Pahang Rubber, Ltd.	Com.	$0.20	Dec. 18	Dec. 12
Plymouth Rubber Co., Inc.	7% Pfd.	$1.75 q.	Jan. 15	Dec. 31
Rome Cable Corp.	Com.	$0.15	Dec. 30	Dec. 12
Seiberling Rubber Co.	"A" Pfd.	$1.25 q.	Jan. 1	Dec. 20
Seiberling Rubber Co.	$2.50 Cv. Pt. Pfd.	$0.62 q.	Jan. 1	Dec. 20
Thermoid Co.	Pfd.	$3.00 accum.	Dec. 15	Dec. 4
Westinghouse Electric & Mfg. Co.	Com.	$1.00	Dec. 20	Dec. 9
Westinghouse Electric & Mfg. Co.	Pt. Pfd.	$1.00	Dec. 20	Dec. 9

FROM OUR COLUMNS

50 Years Ago—January, 1891

A rubber toothbrush when properly made cleanses the teeth better and polishes the enamel without the usual friction that may destroy it. (p. 91)

The Cleveland Rubber Co. has overcome the obstacle of the lapped seam in hose by running a seamless tube somewhat after the manner of lead pipe. (p. 92)

As long ago as 1837 rubber-covered umbrellas were made by the Roxbury Rubber Co. (p. 103)

Who first conceived the idea of making an adhesive and healing plaster with India rubber is not clearly recorded. Tradition has it that Horace Day (1839) in his little shop in New Brunswick, N. J., found in boiling up one of his "messes" of rubber, turpentine, lead, and gums, that whatever it might not do, when spread on cloth it would stick to the skin "like a brother," and the rejected waterproof cloth found favor in the neighborhood as plaster with marvellous properties. (p. 108)

A pair of rubbers sixty years old, and "used in one family all that time," are displayed in a Newburyport, Mass., store window. (p. 110)

25 Years Ago—January, 1916

The fact that Germany is actually making and using synthetic rubber will, of course, startle some readers. (p. 162)

Beadle and Stevens have shown that the darkening of raw rubber is due to the presence of an oxydase. By adding to the latex small quantities of such substances as sodium bisulphate or formalin, which arrest enzyme action, pale rubber of uniform color is obtained. (p. 168)

According to Spence, tackiness is caused by change in the aggregation of the rubber molecule and is not due to chemical change. (p. 168)

A boot which can be used in fomenting the foot or leg of a horse with hot or cold water or any medicinal preparation, is made of heavy canvas with an inside lining and an outside covering of rubber. (p. 172)

The original Firestone factory was built in 1902. The entire office force then consisted of H. S. Firestone and six others. (p. 192)

At Goodyear's annual meeting held at Akron on December 4, S. M. Stadelman and P. W. Litchfield were elected vice presidents, continuing in their former positions as sales and factory managers. (p. 193)

The forecast of $1 rubber is already realized, and the present tone of the market indicates that $1.10 may be reached before long. (p. 208)

CANADA

Analysis of Accident Causes

A recent poster from the Industrial Accidents Prevention Associations, 600 Bay St., Toronto, Ont., listing causes of accidents to workers, showed that out of the 52,272 accidents reported in a year to the Ontario Workmens' Compensation Board, three general headings had more than 5,000 accidents each. These were: power equipment, including engines, shafting, abrasive wheels, saws, shapers, pressers, etc., 10,479; handling of objects, 11,759; and falls of persons, 7,362. About half the falls were from a height, and half on the ground level.

Other causes, in order of seriousness, were hand-tools, motor vehicles, wagons, trucks, trains, etc., flying fragments, falling objects, stepping on or striking against objects, dangerous substances (hot metals, steam, acids, electric current etc.) hoisting apparatus including elevators and miscellaneous causes.

Montreal Fire Department received bids on the supply of 80 heavy-duty tires ranging from $6,970.88 to $7,111.12 but the allowances for old tires varied from $705 to $2,580 so that the net prices ranged from $4,504.72 to $6,381.72.

Canada's imports of crude rubber in the first ten months of 1940 increased 42.7% over the 1939 period to 86,100,000 pounds, the Dominion Department of Trade and Commerce disclosed.

The Dominion Department of Munitions and Supply, Ottawa, Ont., recently awarded the following contracts: *clothing,* Barringham Rubber Co., Ltd., Oakville, Ont., $14,375; Kaufman Rubber Co., Ltd., Kitchener, Ont., $21,260, Canadian General Rubber Co., Ltd., Galt, Ont., $113,660, Dominion Rubber Co., Ltd., Montreal, P. Q., $165,200; Miner Rubber Co, Ltd., Kitchener, $7,800; Gutta Percha & Rubber Co., Ltd., Ottawa, $58,400; *beds and bedding,* B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, $17,500; *land transport,* Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., $6,195, Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., $6,000, Firestone Tire & Rubber Co., Hamilton, Ont., $6,600. The Department also announced the placing of an order for 1,000,000 feet of Canadian hose to be used in quenching the flames of fires in the United Kingdom. The Department did not name the contractor, but stated that the order brought close to 1,200 miles of length of hose Canada is providing to meet United Kingdom orders, for which deliveries began several months ago.

The Canadian rubber industry, because of the war, is extremely busy and expects definite figures for 1940 to reveal new high records. Not only are orders for military purposes being placed continually by the Canadian government, but orders are also being filled for Australia, New Zealand, India, South Africa, and other parts of the Empire, which are getting mechanized transport from Canada. Comparatively new is the demand from Canadian aircraft companies for airplane tires. The Government has bought and set up in three of the largest tire factories several million dollars worth of machinery for making tires for war purposes. Farm implements are also increasingly being fitted with rubber tires, and so widespread have been the demands on Canadian industry that few, if any, Canadian companies manufacturing rubber products have failed to share in the orders given out by the Department of Munitions and Supply, which include not only tires, but clothing and accessories and barrack stores. Total orders placed with Canadian rubber manufacturers as part of the Government's war program aggregate several million dollars. Tire manufacturers are said to be employing a secret British process in making tires for military equipment. The expanding scale of industrial activity is also stimulating the sale of mechanical rubber goods and belting.

Canadian tire manufacturers and distributers experienced a decided increase in business owing to good weather and open roads late into the autumn, and they expect business to be better than normal all winter because the government finds it necessary to keep the roads clear of snowdrifts where they communicate with air fields or military works. The additional traffic will step up the demand for tires. Orders placed by the Department of Munitions and Supply for tires for military vehicles have markedly increased and thus slowed down delivery for civilian vehicles, particularly in the heavy tire field; but the situation is working itself out satisfactorily, and no shortage should result.

Women's rubber footwear is keeping pace with modern fashion, and manufacturers report that the 1941 galosh is trim, light weight, and well fitting. Both fabrics and rubber are lighter, smoother, and more pliable, and there is a stretchable shank which holds the overshoe snugly to the foot and ankle, adapting itself to individual shapes. Linings are fine-woven, and concealed slide fasteners and buckled cuffs give a neat effect. The streamlined model owes its smartness largely to advances in rubber processing, which improve durability, fine texture, flexibility and color. The Dominion Rubber Co. plant at St. Jerome, P. Q., is devoted exclusively to the production of rubber footwear. In the first half of the year the factory produces sneakers, crepe-soled sandals, neoprene-trimmed tennis shoes, and other sports footwear. In June production is switched to overshoes and rubbers.

EUROPE

GREAT BRITAIN

Portable Vulcanizer for Cable Repair

A portable vulcanizer for speedy and scientific joining and repairing of cables was announced by Harvey Frost & Co., Ltd. Bishop's Stortford. This self-contained vulcanizer enables a service electrician to make satisfactory repairs on single and multi-core cables in any out-of-door situation where a break or fault may occur. The device has overall dimensions of only 10 by 8½ by 6 inches and comes packed in a convenient metal container. Heat is applied to a joint by means of solid fuel tablets ("H. F. Flammets"), and the actual time for completing a vulcanized repair after preparation is 15 minutes. Instructions and the few necessary hand-tools are included in the kit, together with specially prepared materials.

For use in the workshop the firm also markets an electric-type model; the process is the same as for the portable model.

Imports and Exports

Imports of crude rubber into the United Kingdom continue to increase and in September, 1940, represented a value of £2,933,466, against £2,573,676 in August, 1940 and £599,800 in September, 1939. Quite evidently the country is stocking up, probably with an eye to possible developments in the Far East.

Because of the danger of damage to rubber stored in pre-war warehouses in London, stocks have been distributed to manufacturers. Supplies of crude rubber and latex were short in June, 1940, although not to the extent that manufacture was seriously hampered, but this condition has now been remedied and ample stocks of latex also are now available. Consumers of latex are being urged, in their own as well as the national interest, to build up their own reserve stock where possible so as to enable them to meet all emergencies.

Exports of rubber manufactures in September, 1940, declined and were valued at £120,150, but imports of rubber goods at £158,900 for the same month were higher than in August, 1940.

Financial News

Owing to war conditions the British Tire & Rubber Co., will not, for the present, issue accounts for the past business year, ended September 30, 1940. However profits earned during the year permit the payment of a final dividend 4½% which, with the previous interim dividend of 3½%, makes 8% in all. In 1939 a total dividend of 8% was also distributed and in addition a bonus of 3%. If accounts justify further distributions, this will again be in the form of a bonus.

For the year ended September 20, 1940, the India Rubber, Gutta Percha & Telegraph Works Co. again paid fixed dividend of 6% and interim dividend of 2% on the preferred ordinary shares, and fixed dividend of 6% and interim dividend of 3% on the ordinary shares. The company, controlled by the British Tire & Rubber Co., has also postponed the issue of its accounts.

Harrisons & Crosfield, Ltd., report net income of £340,622 for the year ended June 30, 1940, against £345,310 in the preceding year.

Heater for Hot Water Bottles

An ingenious device to maintain the temperature of hot water bottles is the "Supreme Miracle," marketed by L. G. Hawkins & Co., Ltd., London. It is a rod-type immersion heater screwed into the neck of the hot water bottle instead of the usual stopper and can be plugged into any convenient outlet. The heater, which fits most bottles, consumes little electricity, it is claimed, and is fully guaranteed.

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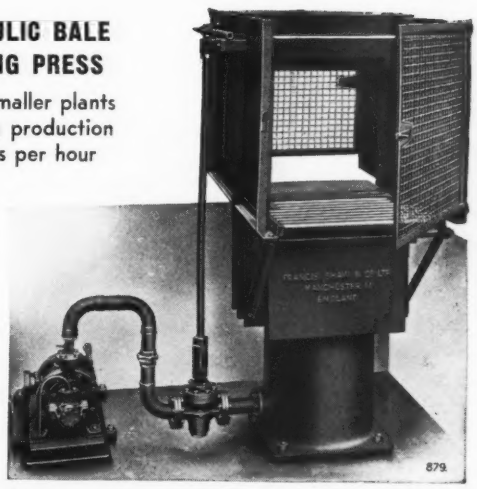

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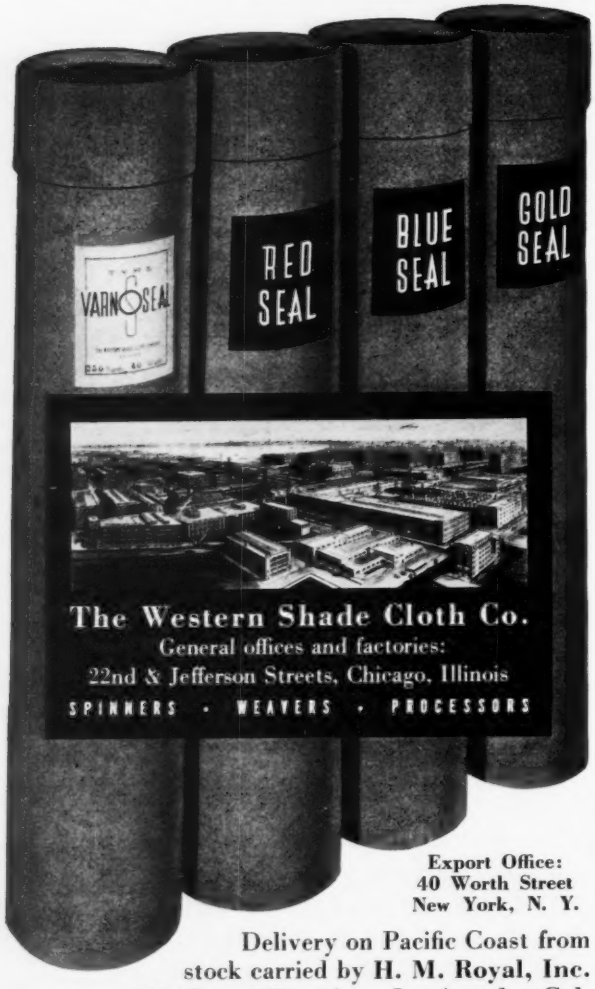

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Delivery on Pacific Coast from stock carried by H. M. Royal, Inc.
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The Purchase Tax

On October 21, 1940, a Purchase Tax went into effect, and articles classed as luxury goods will bear a tax which for certain lines amounts to one-third their wholesale value and for certain others, one-sixth their wholesale value. Various kinds of rubber goods are affected. The tax is paid by the retailer and, of course, is eventually recovered from the public. However to prevent undue increases in prices to the public, the Central Price Regulation Committee has worked out a table to show the new percentage margins allowable to retailers so as to leave them the same cash margins as they obtained before the introduction of the purchase tax. Retailers who may be discovered raising the prices of goods bought before the operation of the tax are liable to severe penalties.

It is expected that the new tax will cause some complications for the export trade, especially to the United States, since here the import duty is calculated on the wholesale prices in the country of origin.

Notes

Dr. P. Schidrowitz, consulting and analytical chemist, has requested that all correspondence be addressed to him at 65 Madeley Road, Ealing, London, W.5, England.

J. L. Milne, chairman of Shaw, Derby & Co., Ltd., and of the Rubber Growers' Association in 1938-39, has been named an additional director of Craigielea Rubber Plantations, Ltd.

An announcement from London, dated December 16, stated that Arthur B. Purvis, for several years president of the Dunlop Tire & Rubber Goods Co. of Canada, Ltd., Toronto, and now director general of the British Purchasing Commission in the United States, has been made a Privy Councilor.

GERMANY

Danger to Rubber Wear in Closets

Rubber is exposed to deterioration from chemical influences even in the clothes closet, Walter Meyer warns German readers in a recent issue of the *Gummi-Zeitung*.[1] Years of practical experience as well as tests have shown, he explains, that if rubberized, rubber-coated, or all rubber weatherproof articles or protective garments for workers are kept for prolonged periods in poorly ventilated closets in which the atmosphere is charged with vapors from naphthalene, camphor, hexaclorethane, paradichlorbenzol, carbon tetrachloride, or other substances used as moth preventives, the rubber will fairly soon become tacky and before long, quite useless.

Substitutes for Leather

Three types of leather substitute[2] are now produced in Germany: the fagelanes, the fabinettes, and the nifarines. The fagelanes are built up of fabrics coated with some water insoluble substances. Nowadays the fabric is usually made of some artificial fiber, and the coating is based on drying oils, rubber, cellulose lacquers, acryl resins, synthetics like the igelites, mipolam, oppanol, and co-polymerizates. The fagelanes are the oldest type of leather substitute and the best developed. Present difficulties met with in their production are chiefly due to the necessity of changing over to newer and different kinds of basic materials. The fagelanes are used mainly by the saddler trade, for upholstering materials, bookbinding, sweatbands. To-day they are sometimes also used for uppers of house-shoes and to a limited extent also instead of sleeked leather. These materials are thin (0.1 to 3 millimeters), flexible, and elastic and resemble leather in appearance only.

The fabinettes are composed of various kinds of animal, vegetable, or artificial fibers, or shredded leather, and a suitable binder. They are from one to six millimeters thick and serve as substitutes for shoe leather (soles, heels, counters,

[1] Oct. 11, 1940, p. 736.
[2] "Synthetics in Place of Leather." F. Stather and H. Herfeld, *Kunststoffe*, Sept., 1940, pp. 253-60.

welting, etc.) and to some extent also as upholstery materials and packing for machinery. While rubber latex, sometimes combined with reclaimed rubber, and Buna are especially suitable binders, present conditions do not permit their use for any except the nifarine type of leather substitutes. In the production of fabinettes, binders based on polyvinyl and polyacryl resins are practically exclusively used.

Whereas fabrics form the base of fagelanes, and fabinettes are made with over 50% of fibers, the chief constituents of the nifarines are materials like rubber, Buna, synthetic resins, and other substances insoluble in water, while the fillers account for less than 50% of the total mass. As fillers are used mineral substances, sawdust, tar products, etc. Nifarines serve chiefly as soling material, for packing, and to a certain extent for upholstery and making bags, trunks and the like. For soling material, 12 to 14% Buna, plus reclaimed rubber and fillers are sometimes used.

A comparison of leather substitutes made with rubber or Buna and similar products made with synthetic resins reveals that the former have the advantage of superior resistance to wear, water, and cold. However, in the form of soles, they are said to cause the feet to become heated to a greater extent than is the case with soling employing artificial resins. The latter type of soling is also reported as being easier and more firmly attached to the shoe uppers than soling in which rubber or synthetic rubber has been used. Binders based on artificial resins further give better aging resistance than rubber binders, and their water resistance actually improves when they are stored in a warm place. It is thought that research work with co-polymerizates will provide a way of overcoming the defects of materials made with synthetic resins.

Packing, sleeves, couplings, etc., made with Buna have in some respects given better results than similar goods made of chrome leather, chiefly because of the high heat resistance of Buna.

New Extrusion Nozzle

A new type of nozzle for extrusion work in insulating wires consists of two tubes screwed into each other. The interior one has an exchangeable nipple for holding the wire to be covered; the outer tube is provided at its front end with three or more blade-like supports which rest against the inside walls of a conical mouthpiece holder so as to insure that the nipple is properly centered at all times. Feeding of the insulation mass is regulated by advancing or turning back the threaded inside tube. This arrangement also makes it possible to bring the nipple up against the inside walls of the conical mouthpiece so as to block the flow of rubber and permit the insertion of a fresh wire with ease and without interfering with the operation of a neighboring nozzle. The machine, therefore, does not have to be stopped for the purpose.

Mouthpiece and nipple are easily removed and replaced by others to accommodate wires of different diameters, and as the supports on the outer tube insure that the wire is always properly centered, no re-adjustment from the outside, by set-screws or similar means, is required each time a wire is to be changed, or operations have to be stopped for any reason.

Dechema Report

The Dechema, German Society for Chemical Plant, has just issued its report covering activities in 1939. The highly successful work of the Society included scientific lectures, reports on scientific progress, work by committees for the development of chemical equipment, financial support for the solution of technical and scientific problems, the Congress-Show "Construction Materials and Chemistry" held in Breslau.[3] The first report of the F.B.B.K., the new Department for Research and Consultation for Physico-Chemical Plant Control and Laboratory Technique, is published as well as the 1939 report of the Max Buchner Foundation, which is under the honorary supervision of the Dechema and investigated a variety of important problems in the year. Finally is a list of all the standardization sheets for chemical equipment which the Dechema has worked out already or is now working on.

[3] See India Rubber World, Dec., 1940, pp. 71-72.

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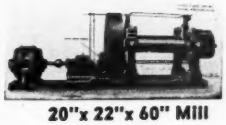

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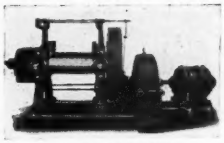

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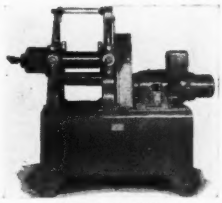

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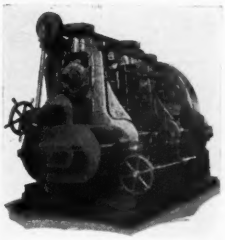

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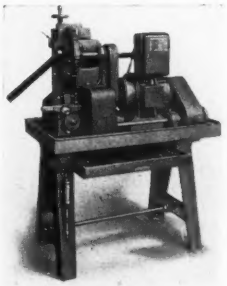

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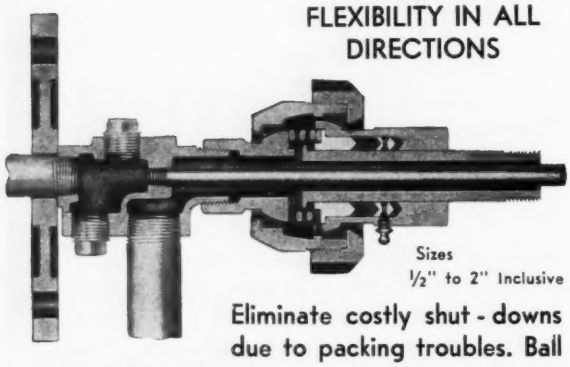

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EUROPEAN NOTES

An order published by the Hungarian Government on September 3, 1940, forbids the use of rubber in the manufacture of 106 different articles, chiefly luxury goods or such as can also be made from other materials and includes bathing and beach accessories, cushions, toys, etc.

N. V. Rubberfabriek "Het Y" (Rufay), a new rubber factory, recently was established in Amsterdam, Holland. The founders of the concern, capitalized at 500,000 guilders, are L. W. Hoette, H. A. F. Overmeijer, and J. Schilt.

The cable factory, Standard Telefon & Kabelfabrik, Aker, Norway, has raised its capital from 3,000,000 to 4,000,000 kroner.

In both Belgium and Norway regulations have been passed according to which the manufacture and trade in all kinds of rubber in any form is forbidden without special permit.

Following the annexation of the Latvian Republic to the U.S.S.R., Soviet laws on the nationalization of private property are being enforced in Latvia. All retail trading enterprises with an annual turn-over of 100,000 lats or more are affected. These include 64 stores dealing in leather, fur and rubber goods, and 39 stores handling household goods, sporting goods, toys, school supplies, and art goods.

FAR EAST

MALAYA

Effect of Assessments on Untapped Areas

The decisions of the International Rubber Regulation Committee to increase the export quota to 90% for the last quarter of 1940 and to 100% for the first quarter of 1941 have brought up the question of Malaya's ability to fill this quota, and related therewith, the method of assessing untapped areas of seedlings and bud-grafts. In some quarters it is held that the loss of old rubber areas cut out in replanting schemes, combined with the rather general practice of planters to postpone the commercial tapping of the highly assessed young bud-grafts until the eighth or the ninth year, will make it hard for many estates to fill their quota.

Planters defer the tapping of their budded trees as long as possible, for apart from the fact that early tapping is usually uneconomical, young trees, and especially young bud-grafts are more easily wounded than older trees. Furthermore the yields of buddings in the early years are sometimes disappointing and might lead to a reduction in the standard production figure of an estate. The present method of assessment is favorable to the practice of postponing tapping as far as bud-grafts are concerned, but really penalizes the grower of high-grade seedlings.

The assessment scale for untapped young buddings of approved clones ranges from 200 pounds an acre for trees five to six years old, with a girth of 16 inches at 36 inches above the union and a minimum stand of 120 trees per acre to 1050 pounds per acre for trees ten to eleven years old, with a girth of 24 inches at 36 inches above the union, and a minimum stand of 85 trees per acre. For untapped seedlings, however, the assessment scale is from 100 pounds per acre for trees four to five years old with a girth of 20 inches at 20 inches height, and a minimum stand of 120 trees per acre, to a maximum of 500 pounds per acre for trees eight to eleven years old, having a girth of 36 inches at 20 inches height and a minimum stand of 90 trees per acre. No distinction is made between trees from ordinary seed and those grown from approved clonal seed. It is logical then that revision of present assessment methods for untapped areas is being urged for under present conditions growers of high-grade seedlings are practi-

cally forced to tap early in order to prove by tapping results that they rate a higher standard production figure than they have been given on the basis of the assessment scale.

However, if planters should decide to abandon their usual practice in order to fill their quota and tap their buddings at five and six years instead of waiting two or three years more, the yield capacity of such young trees under commercial conditions of tapping would be very thoroughly tested and the justice or the reverse of the existing method of assessment would be established.

Exports of Crude Rubber

Net exports of crude rubber from British Malaya have been high for some time, and by the end of September, 1940, the export quota was exceeded by 22,501 tons. For the ten months to the end of October, 1940, net exports reached the record total of 447,245 long tons, against 306,765 tons for the corresponding period of 1939.

New Rubber Factory

Rubber manufacture in Malaya, too, is feeling the stimulus of war conditions. In July, 1940, local manufacturers used 155 tons of rubber, against an average monthly consumption of 82 tons in the first seven months of the year.

It is learned that a new rubber factory is to be established at Klang, Selangor, by the Fung Keong Rubber Manufactory (Malaya) Ltd., of Hong Kong, to manufacture tires, tubes, shoes, and general rubber goods. The company is said to have the services of an American technical adviser, who is now buying American machinery for it.

INDIA

India's tire manufacturing industry dates from 1936 when Dunlop established the first tire factory at Sahagunj, Calcutta. Although the new venture was given no assistance by protective measures from the government, it developed rapidly so that now it is able to supply most of India's requirements of tires and tubes for motor, bicycle, and animal-drawn vehicles, at prices which dropped steadily, until just before the war broke out they were 30% lower than before local manufacture was started. The Indian tire industry is proving its value today when the accelerated defense program is making extra demands, and it is working to capacity to fill the special requirements of the country as well as to help meet the military demands of the Empire.

India is fortunate in having her own rubber plantations to fall back on for raw material. There is some confusion about production figures, but official export statistics indicate that in 1939 South India shipped 27,360,650 pounds of rubber; in the same year, local consumption of crude rubber is estimated to have been about 7,821,000 pounds.

PHILIPPINE ISLANDS

It may not be generally known that the Philippine Islands has a rubber footwear industry which of late seems to be expanding rapidly and is calling attention to itself by the substantial shipments it made to the United States in 1940. From United States statistics it is seen that whereas in the whole of 1939 the Philippines sent to the United States only 8,152 pairs of rubber-soled canvas shoes, value $2,683, it exported 201,546 pairs, value $53,948, in the first eight months of 1940. Similarly, shipments of waterproof rubber footwear to the United States soared from 300 pairs, value $235, in the whole of 1939, to 37,413 pairs, value $11,037, in the first eight months of 1940.

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NETHERLAND INDIA

Huge shipments of native rubber, 26,758 tons, were largely responsible for the heavy October, 1940, exports from Netherland India, which were 2,175 tons above the permissible amount and 6,116 tons higher than September exports. Of the October total of 50,175 tons, estate rubber accounted for 23,417 tons.

Data concerning the imports of rubber goods during the first half of 1940 show various new trends resulting from conditions in Europe. Thus the fear of interruption of supplies of belting, no less than increased demand, caused exceptionally large imports of these goods into Java, 161,132 kilos, against 63,056 kilos in the same period of 1939. Automobile tire imports in the first six months of 1940 were 29,776 units, against 23,757 units in the corresponding months of 1939. The 1940 shipments included no tires from Germany and reduced supplies from Japan; the increase was shared by the United States, Canada, France, and the United Kingdom. But imports of bicycle tires fell from 389,105 to 240,039 units.

While the war caused a certain decrease in the production of automobile tires, output of cycle tires rose. The declaration of war caused a sharp drop in the exports of automobile tires in the latter part of 1939, but there was some recovery in 1940 which is expected to continue as a result of a decision of British India to grant general import permits to Netherland India products.

Rubber consumption fell sharply in the first half of 1940, and it is estimated that local industry took only 1,200 tons against 1,305 in the first half of 1939 and 1,905 tons in the second half of that year.

The Netherland India Government for some time has been endeavoring to establish a chemical industry here, and recently the Department of Economic Affairs, Java, invited a group of experts to investigate the possibilities of making products needed in agriculture, in the rubber industry, and for national defense.

AUSTRALIA

Australia's imports of rubber and rubber goods increased considerably in the fiscal year 1939-40 and represented a value of £2,200,000 as compared with £1,500,000 in the preceding year.

Henry Kearton, who arrived in the United States late in November to visit relatives, will sail from San Francisco, Calif., on January 7 on the *S. S. Monteray* for Australia. Mr. Kearton is connected with G. Bramall & Co., West Footscray, Melbourne, manufacturer of the "Bramac" rubber coat, which firm, he said, has been very busy working day and night on defense orders for Australia and New Zealand. He further stated that business in general "Down Under" is very brisk.

THAILAND

Thailand is reported to have exported 41,753 metric tons of crude rubber in 1939, against 41,600 metric tons in 1938.

The Thailand Government's interest in developing the natural resources of the country and in fostering local industry is apparent from two recent notices. According to one, the Minister of Agriculture bought 160 acres of planted rubber (24,000 trees) in the Province of Nakorn Srithamara. Additional areas are also said to be under consideration; the plan is to create model gardens to train Thai labor in the proper methods of planting, tapping, and preparing rubber.

Next it is reported that the government is contributing half the capital of 2,000,000 bats to start a rubber factory at Singora. The new factory will be located near the rubber growing region and will produce shoes, cycle tires, and other rubber goods.

Editor's Book Table

NEW PUBLICATIONS

"Chemical Processing Equipment." Bulletin No. 353. The J. H. Day Co., Cincinnati, O. 16 pages. This illustrated bulletin presents the firm's equipment designed to meet industry's needs of mixing, masticating, and sifting. The machines shown include: the Mogul experimental kneader and mixer with interchangeable agitators to secure different types of mixing or masticating action; midget three-roll mill; pot mill; pony mixer; Gyro, Turbo, and Jumbo mixers; Ro-Ball gyrating screen; and various other types of mixing equipment for large-scale production or laboratory work. Among the machines designed for special purposes are a foam rubber mixer with wooden agitators, and two rubber cement mixers, one of which utilizes four sets of stationary blades and two sets of rotating blades. The close clearance between blades is said to provide a rapid shearing action on the rubber pieces.

"A.S.T.M. Standards on Electrical Insulating Materials." November, 1940. Prepared by Committee D-9. Published by American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. Price $2. 344 pages. This 1940-41 edition includes all standards believed of importance in making tests on insulating materials, together with the current report of Committee D-9 and the personnel of this committee. The standards, as classified in groups, and the number in each group follow: insulating varnishes, paints, lacquers, and their products—7; molded insulating materials—7; plates, tubes, and rods—7; mineral oils—2; ceramic products—3; solid filling and treating compounds—1; electrical tests—6; insulating paper—1; mica products—3; textile materials—9; and rubber products—5. The standards on rubber products cover specifications for: friction tape for electrical purposes; rubber insulating tape; gloves for electrical workers, and matting and blankets (proposed draft) for use around electrical apparatus or circuits not exceeding 3,000 volts to ground. The rubber standards are all under the jurisdiction of Committee D-11 on Rubber Products.

"British Standard Methods of Testing Vulcanized Rubber." (B.S. No. 903) Published by British Standards Institution, 28 Victoria St., London, S.W.1, England. June, 1940. Price 5s. net, 5s. 4d. post free. 78 pages. The first edition of this standard combines under one cover all approved test methods which relate to the chemical and physical testing of vulcanized rubber as practiced in England. The methods presented are based on those of the Research Association of British Rubber Manufacturers as published in "Rubber Physical and Chemical Properties." Explanation of terms involved in the chemical and physical tests and directions for sample preparation precede detailed instructions for 16 chemical and 22 physical tests. Tests for resilience, abrasion resistance, compression set, and ply adhesion are omitted, but are under consideration for incorporation in a future edition.

"Manhattan V. D. B. Wheels." Bulletin No. 6878. The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. 8 pages. This illustrated folder describes the new V. D. B. (vibration dampener bushing) resilient rubber mounting now being built into Manhattan wheels for portable grinders and also lists ten advantages which may be obtained, including elimination of vibration, better finish, less fatigue, and increased production to the operator.

"Goodall Mechanical Rubber." Catalog No. 207. Goodall Rubber Co., Inc., Five South 36th St., Philadelphia, Pa. 72 pages. Bound in loose-leaf fashion and protected by a transparent cover, this catalog lists approximately 275 brands and specifications, including 74 additions, of the firm's mechanical goods, such as belting, hose, couplings, fittings, packing, hard rubber products, and clothing. Besides 142 colored illustrations much tabular data are given for the different products.

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"The Arochlors—Physical Properties and Suggested Applications." Monsanto Chemical Co., St. Louis, Mo. 20 pages. The eleven Arochlors described in this booklet range in form and appearance from mobile oily liquids to fine white crystalline and hard transparent resins. The Arochlors are suggested for use in rubber to impart tackiness and adhesion, as a flame reducer, and as a plasticizer for crepe rubber resin in paint compositions where it also increases the gloss and alkali resistance of the film. These materials are also recommended as plasticizers for chlorinated rubber, as compounding materials for vinyl resins, and for use with synthetic rubbers to impart fireproofing quality. The booklet also briefly describes Santowax, which is suggested for use in the prevention of sun checking of rubber.

"Properties of Ameripol." Information Bulletin No. 8000. The B. F. Goodrich Co., Akron, O. 2 pages. The properties of compounds made with Ameripol, Goodrich's butadiene synthetic rubber, as briefly cited in this bulletin, include: hardness, tensile strength, elongation, weight, color, odor and taste, elasticity and permanent set, tear and abrasion resistance, and resistance to oils, heat, cold, acids, alkalis, light, ozone, and aging. The bulletin recommends the use of Ameripol where the following properties are important: resistance to mineral, animal, and vegetable oils and fats; resistance to the oxidizing influence of the metallic soaps used as driers in paints and inks; resistance to heat; and resistance to abrasion, particularly in the presence of oil.

"Synthetic Organic Chemicals." Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. 96 pages. The tenth edition of this booklet, which contains six new chapters and 66 products not included in previous editions, presents the properties, uses, and specifications of the firm's chemical products in condensed form. The products, as grouped in this book, are: alcohols, glycols, ethers and oxides, alcohol-ethers, esters, ketones, aldehydes, organic acids, anhydrides, chlorinated compounds, amines, penetrants, "Carbowax" compounds, synthetic resins, activated carbons, and hydrocarbons. Rubber solvents, a latex stabilizer, a mold lubricant, a latex dispersing agent, a latex defoaming agent, and a rubber lubricant are among the chemicals listed; while a number find use in the synthesis of rubber chemicals. One chapter is given over to "Vinylite" resins and includes series Q, rubber-like materials when plasticized. The book has an attractive cover, surface-treated with "Vinylite."

"Mechanical Rubber Goods." New York Rubber Corp., Nine Rockefeller Plaza, New York, N. Y. 20 pages. In loose-leaf form with an attractive heavy-paper cover appear illustrated descriptions in color of Wiccapee mechanicals as belting, hose, packing, engraving rubber, and miscellaneous specialties. Besides technical data on the various items the catalog contains a brief history of the company, which, incorporated in 1851 is the second oldest manufacturer of mechanical rubber goods in the United States, and also a facsimile of a communication to the company from Charles Goodyear, dated Paris, October 1, 1854.

"Flexibility in Mixing Operations with Glen Mixers." American Machine & Foundry Co., 511 Fifth Ave., New York, N. Y. 8 pages. The vertical mixers described in this booklet operate on the planetary principle and utilize interchangeable agitators and mixing bowls for increased flexibility. One of the three mixers described is powered by a 7½ h.p. motor and will accommodate three sizes of bowls: 30, 45, and 85 gallons. The other two mixers use 2 and 3 h. p. motors, while either will accommodate the following bowl sizes: 10, 15, 20, 30, and 40 gallons.

"Hewitt Rubber Products for the Oil Producing and Refining Industries." Hewitt Rubber Corp., Buffalo, N. Y. 16 pages. This is the second of three parts in which the firm's general hose catalog is being issued. In it are described and illustrated the following Hewitt products: multiple-length rotary hose for oil well drilling; mud pump suction hose; flue-cleaning hose for cleaning tubes of refinery stills, etc.; steam hose; welding hose; fire hose; transmission belts; and industrial packings.

"The Story of Modern Industrial Weighing." The Exact Weight Scale Co., Columbus, O. A variety of the firm's industrial scales for checkweighing, handweighing, compounding, balancing, testing, and counting is shown in this folder which honors Walter Standish Smith, the inventor of Exact Weight scales who received a Modern Pioneer Award last winter for his work in this field.

"Jacket Water Coolers." Bulletin No. W-100. Condenser Service & Engineering Co., Inc., 310 Twelfth St., Hoboken, N. J. 8 pages. Blueprints and photographs in this bulletin show construction details of the firm's heat exchange equipment for Diesel engine jacket water cooling, for condensing vapors, and for raw to fresh water cooling. A typical diagrammatic layout for Diesel engines and pertinent technical data are included.

"Hand Book of Building Maintenance." Fourth Edition. Flexrock Co., 2300 Manning St., Philadelphia, Pa., 72 pages. Treating of floors, roofs, and walls, this booklet was written as a ready reference for those responsible for the maintenance of industrial buildings and structures. Helpful hints and the company's special products are detailed for wearing-surface materials, leak-stopping, and waterproofing. Incidentally, the wearing of rubber gloves is advised for handling certain products.

BOOK REVIEWS

"Experiments in Colloid Chemistry." Ernst A. Hauser and J. Edward Lynn. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. 1940. Cloth, 6 by 9 inches, 190 pages. Subject and name indexes. Price $2.

In their preface the authors point out the growing interest in the science of colloids and the lack of general lecture or laboratory experiments in colloid chemistry, a deficiency which they attribute to the general belief that most experiments in this field are either too complicated or too expensive for the average educational institution. This view, not held by the authors, is adequately disproved by this series of experiments, the bulk of which are relatively simple and inexpensive to perform. While designed primarily for use in laboratory courses on the subject, the manual contains a number of experiments suitable for lecture demonstrations. Industrial laboratories, initiating programs of colloidal research, should also find the book helpful as a reference on laboratory technique.

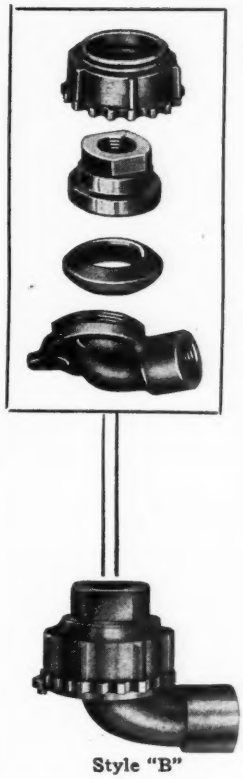
The manual, comprising a total of 214 experiments, is divided into several chapters which cover the various colloidal phenomena: dialysis, electrokinetics, surface phenomena, coagulation and dissolution, protection and sensitization, optics, gelation, emulsification, viscosity, and particle size. Chapters are also devoted to the preparation of colloidal systems and to experiments of historical interest. Because of the authors' belief that rubber latex and crude rubber are ideal materials for demonstrating colloidal properties, they have included a separate chapter of 18 experiments involving these substances.

"Physical Chemistry of High Polymeric Systems." H. Mark. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 1940. Cloth, 6 by 9 inches, 345 pages. Author and subject indexes. Price $6.50.

In the second volume of this series, the results of studies which deal primarily with the relation between the structure and properties of the high polymers are correlated and analyzed. Pointing out in his preface that much of the work in this field has been based on empirical relationships, the author of this book shows how the fundamental laws of physical chemistry can be developed and extended to fit into the science of the high polymers.

The seven main sections of the book, with some of the more important subdivisions indicated in parentheses, are as follows: The Geometry of Molecules (structure determination with X- and cathode-rays, behavior in electrical field, and optical behavior); The Internal Motions of Molecules (methods of determination and results such as moments of inertia, nuclear

(*Continued on page* 84)



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Market Reviews

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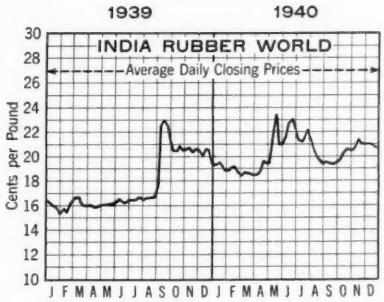
TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Oct. 26	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Dec. 28
"New" Standard						
Dec.	20.30	20.50	20.82	20.80	20.62	.....
Jan.	.....	.....	20.38	20.70	20.68	20.37	20.20
Mar.	19.94	20.13	20.45	20.45	20.20	20.05
July	19.60	19.70	20.05	20.10	19.94	19.70
Sept.	19.55	19.60	19.95	20.00	19.69	19.60
Nov.	.....	.....	.....	19.85	19.90	19.57	19.50
No. 1 Standard						
Dec.	20.30	20.45	20.82	20.80	20.62	.....
Jan.	.....	.....	20.33	20.70	20.68	20.37	20.20
Mar.	19.94	20.13	20.45	20.45	20.20	20.05
May	19.75	19.93	20.25	20.25	19.99	19.90
Volume (tons) per week						
"New" Standard	30	160	870	190	560	220
No. 1 Standard	1,940	7,070	2,290	1,060	1,780	1,370

THE rubber futures market ruled firm and generally quiet during the past month. After closing at 20.12¢ per pound on November 29, March futures (old contract) strengthened to close at 20.55¢ on December 9 and then became easier to close at 20.20¢ per pound on December 21. Thereafter the market was easier, and the closing price on December 30 was 20.12¢ per pound.

Some concern was felt during the month over the increasing losses of British shipping and the possibility that some bottoms now in use in the Far East would be rerouted to other waters. In this connection the Department of Commerce pointed out that British and Dutch shipping agents in the Far East have charged that American buyers of crude rubber are offering to pay ⅛¢ per pound premium if space can be secured on American bottoms. The reason for this alleged discrimination was said to be the lower insurance rates for American boats. Local shipping authorities in Singapore and Penang, who have been making attempts to obtain full cargoes for British and Dutch vessels, state that unless such bottoms are more fully utilized they will be diverted to other routes. Such a diversion might result in a space shortage within a short time. Of 51,591 tons of rubber shipped from Malaya during September to the United States, 33,930 tons were shipped in American vessels.



New York Outside Market—Spot Ribbed Smoked Sheets

November crude rubber consumption of 54,652 long tons in the United States was 3.2% below October. However November had 10% less working days than October, which would indicate an actual increase in the rate of consumption. During December crude rubber consumption here continued at the November level or perhaps somewhat better. The overall consumption for the month will depend upon the extent of inventory shutdowns at the year-end, but the figure should be at least 50,000 tons, it is believed. This would place 1940 consumption over the 600,000-ton level for a record all-time high. Current indications point to a heavy consumption for January.

The higher export quota of 100% announced here last month has had little effect on the rubber market, and the spot price still remains above the 20¢ per pound level, the upper limit for Rubber Reserve Co. purchases. It would appear that rubber producers are

New York Outside Market Rubber Quotations

Latex	Dec. 28, 1939	Nov. 27, 1940	Dec. 30, 1940
Normal, 38-40%, *gal.*	$0.77/0.78	$0.79/0.80	$0.78/0.79
Centrifuged, 60-63% *gal.*	.. ..	1.35/1.36	1.34/1.35
Paras			
Upriver fine *lb.*	.21¼	.17	.16½
Upriver fine *lb.*	*24¼	*.20¼	*.19¾
Upriver coarse *lb.*	.12	.11½	.11½
Upriver coarse *lb.*	*.19	*.17¼	*.16⅞
Islands fine *lb.*	.20	.16¾	.16
Islands fine *lb.*	*.24	*.19¾	*.19¼
Acre, Bolivian fine *lb.*	.21½	.17¼	.16¾
Acre, Bolivian fine *lb.*	*.25	*.20½	*.19⅞
Beni, Bolivian fine *lb.*	.22	.18½	.18
Madeira fine *lb.*	.21¼	.17	.16½
Caucho			
Upper ball *lb.*	.12	.11½	.11½
Upper ball *lb.*	*.19	*.17¼	*.16¾
Lower ball *lb.*	.11½	.11	.10½
Pontianak			
Pressed block *lb.*	.12½/.18	.12/.22	.16/.25
Guayule			
Ampar *lb.*	.15	.15½	.15½
Africans			
Rio Nuñez *lb.*	.17½	.18½	.18½
Black Kassai *lb.*	.17½	.19	.19
Prime Niger flake *lb.*	.25	.22½	.22½
Gutta Percha			
Gutta Siak *lb.*	.17⅛	.18	.16½/17½
Gutta Soh *lb.*	.23	.25	.27
Red Macassar *lb.*	1.25	1.20	1.20
Balata			
Block Ciudad Bolivar *lb.*	.35	.42	.42
Manaos block *lb.*	.40	.45	.45
Surinam sheets *lb.*	.48	.54	.54
Amber *lb.*	.50	.56	.56

* Washed and dried crepe. Shipments from Brazil.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	November, 1940						December, 1940																	
	25	26	27	28	29	30	2	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21
No. 1-X R.S.S. in cases*	21⅛	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞
No. 1 Thin Latex Crepe	21⅛	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞
No. 2 Thick Latex Crepe	21⅛	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	20⅞	20⅞	20⅞	20⅞	20⅞	20⅞
No. 1 Brown Crepe	19¼	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19	19	19	19	19	19
No. 2 Brown Crepe	19	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18¾	18¾	18¾	18¾	18¾	18¾
No. 2 Amber	19¼	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19⅛	19	19	19	19	19	19
No. 3 Amber	19	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18⅞	18¾	18¾	18¾	18¾	18¾	18¾
Rolled Brown	15⅝	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜

New York Outside Market (Continued)

	December, 1940					
	23	24	25†	26	27	28
No. 1-X R.S.S. in cases*	20⅞	20⅞	..	20¾	20⅝	20⅝
No. 1 Thin Latex Crepe	20⅞	20⅞	..	20¾	20⅝	20⅝
No. 2 Thick Latex Crepe	20⅞	20⅞	..	20¾	20⅝	20⅝
No. 1 Brown Crepe	19	19	..	18⅞	18⅞	18⅞
No. 2 Brown Crepe	18¾	18¾	..	18⅝	18⅝	18⅝
No. 2 Amber	19	19	..	18⅞	18⅞	18⅞
No. 3 Amber	18¾	18¾	..	18⅝	18⅝	18⅝
Rolled Brown	15⅜	15⅜	..	15¼	15¼	15¼

*No. 1-X Ribbed Smoked Sheets are ⅛¢ lower than No. 1-X R.S.S. in cases quoted here. †Holiday.

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	INQUIRY
2817	Manufacturers of rubber aprons.
2818	Manufacturers of bath mats.
2819	Manufacturers of bathing caps.
2820	Manufacturers of raincoats.
2821	Manufacturers of crude rubber cutters.
2822	Manufacturers of Bovel and Perma-Grip.
2823	Manufacturers of rubber paint.
2824	Manufacturers of machinery for making rubber tires and tubes.

reluctant to offer rubber "freely" within the price range of the agreement.

New York Outside Market

The outside market was relatively quiet during December. Shipment offerings from the Far East were very limited. A fair demand was reported at mid-month from medium sized rubber factories. The market ruled somewhat easier, and the price of No. 1-X ribbed smoked sheets, which held steady at 21¢ per pound from November 26 to December 14, dropped to 20⅞¢ per pound on December 15, where it remained until December 24. The closing price on December 30 was 20¾¢ per pound, with the market easier.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1938	26,606,048	$ 4,147,318
1939	61,460,003	10,467,552
1940		
Jan.	7,639,568	1,412,728
Feb.	4,862,684	947,524
Mar.	7,561,780	1,473,056
Apr.	8,430,063	1,608,156
May	8,029,276	1,523,879
June	5,490,018	1,004,007
July	5,109,739	993,411
Aug.	5,102,983	1,022,531
Sept.	6,614,718	1,337,487
Oct.	2,590,088	512,153

Data from Leather and Rubber Division, Washington, D. C.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940			
Jan.	15,018	5,044	6,389
Feb.	15,319	5,062	4,761
Mar.	15,656	4,869	4,532
Apr.	16,881	5,128	3,902
May	18,095	5,075	3,862
June	18,886	4,528	3,737
July	17,641	3,323	4,567
Aug.	16,386	4,583	5,808
Sept.	14,232	4,046	6,200
Oct.	14,619	5,332	5,916

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

IMPORTS, CONSUMPTION, AND STOCKS

THE Rubber Manufacturers Association, Inc., estimated that United States rubber manufacturers consumed 54,652 long tons of crude rubber during November, 3.2% below October and 1.8% under November, 1939.

Gross imports for November, as reported by the Department of Commerce, were 72,901 long tons, 2.4% under October, but 70.4% over November, 1939.

Total domestic stocks are estimated by the Association to have been 276,943 long tons on November 30, 6.9% over the stocks on hand October 31 and 163.2% over the stocks on hand November 30, 1939.

Stocks in the hands of the United States Government on November 30 were 85,669 long tons, against October 31 stocks of 57,131.

Crude rubber afloat to U. S. ports on November 30 is estimated at 158,095 long tons, 5.2% under October, but 38.6% above November, 1939.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Production (Net Exports)‡	World Consumption Estimated‡	World Stocks†‡§
1937	584,851	543,600	262,204	63,099	57,785	44,792	1,139,800	1,105,002	646,252
1938	400,178	437,031	331,500	45,105	86,853	27,084	894,900	942,252	596,498
1939	499,616	592,000	125,800	91,095	44,917*a*	15,299	1,004,429	1,110,358	447,666*a*
1940									
Jan.	72,520	54,978	142,368*b*	90,285 *b*	.....	35,928	108,883	106,073	.....
Feb.	43,088	49,832	134,328*b*	112,257 *b*	.....	33,563	113,863	96,755	.....
Mar.	59,277	50,192	142,414*b*	113,619 *b*	.....	23,830	112,221	102,282	.....
Apr.	70,699	50,103	162,459*b*	102,557 *b*	.....	42,239	88,326	100,570	.....
May	51,431	51,619	161,446*b*	109,364 *b*	.....	32,731	123,047	94,960	.....
June	53,889	46,506	168,235*b*	119,138 *b*	.....	32,375	110,421	78,642	.....
July	69,596	47,011	190,222*b*	139,629 *b*	.....	36,716	127,215	75,607	.....
Aug.	73,028	50,234	213,002*b*	141,286 *b*	.....	40,425	119,482	79,495	.....
Sept.	78,973	50,206	241,358*b*	137,033 *b*	.....	29,069	133,897	77,906	.....
Oct.	74,716	56,477	259,140*b*	166,837 *b*	.....	33,638	131,223	89,177	.....
Nov.	72,901	54,652	276,943*b*	158,095 *b*	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a.* Stocks as of Aug. 31, 1939. *b.* Includes government emergency rubber.

U. S. Crude and Waste Rubber Imports for 1940

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1940	Totals 1939	Miscellaneous Balata	Miscellaneous	Waste
Jan. .....*tons*	68,856	2,768	406	161	74	255	72,520	37,082	107	648	241
Feb.	40,338	1,458	553	453	30	256	43,088	31,038	75	316	34
Mar.	56,027	2,720	119	49	42	320	59,277	45,724	89	659	26
Apr.	66,688	3,219	374	97	12	309	70,699	32,031	63	581	8
May	47,321	2,883	729	186	24	288	51,431	45,886	150	596	204
June	50,785	2,365	267	146	1	325	53,889	34,363	83	494	20
July	67,077	1,586	494	139	54	246	69,596	37,372	152	345	7
Aug.	70,102	2,038	282	206	73	327	73,028	38,585	52	834	107
Sept.	75,239	2,475	794	...	185	280	78,973	37,689	49	1,038	97
Oct.	72,147	1,044	510	461	190	364	74,716	45,628	73	987	161
Nov.	69,204	1,931	610	668	82	406	72,901	42,770	81	554	54
Total 11 mos., 1940 .....*tons*	683,784	24,487	5,138	2,566	767	3,376	720,118*	.....	974	7,052	959
Total 11 mos., 1939 .....*tons*	397,666	20,281	4,315	2,981	543	2,386	.....	428,168	848	6,820	1,215

**Revised total* 719,795; *previous monthly corrections not available. Compiled from The Rubber Manufacturers Association, Inc., statistics.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia†	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total
1938	372,000	298,100	49,500	8,500	6,700	9,500	17,800	41,600	59,200	862,900	2,000*	2,900	3,100	5,900*	15,300	2,800	894,900
1939	376,755	372,046	61,028	9,241	6,616	11,864	24,014	41,753	65,219	968,536	2,079*	5,435	2,824	6,600*	16,094	2,861	1,004,429
1940																	
Jan.	26,229	54,148	7,698	839	833	1,858	2,256	5,722	5,238	104,821	185	1,191	147	600	1,550	389	108,883
Feb.	45,651	37,958	8,946	2,030	892	1,164	2,678	4,307	6,931	110,557	94	477	234	600	1,662	239	113,863
Mar.	47,885	42,355	5,305	1,070	871	1,050	3,526	3,111	3,551	108,724	178	548	343	600	1,482	346	112,221
Apr.	25,454	44,416	4,144	817	990	1,799	2,951	1,834	2,927	85,332	203	598	120	600	1,159	317	88,329
May	57,874	40,436	7,337	972	1,046	1,370	2,696	2,582	4,578	118,891	195	364	361	600	2,305	331	123,047
June	45,471	44,834	5,603	841	712	1,421	4,077	2,178	2,730	107,867	168	405	200*	600	1,080	101	110,421
July	42,861	60,482	7,300	884	310	1,757	2,494	4,253	4,045	124,426	169	342	200*	600	1,035	443	127,215
Aug.	45,872	45,078	8,139	1,257*	75	1,593	2,640	4,545	7,337	116,536	278	308	200*	600	1,233	327†	119,482
Sept.	58,892	44,009	9,985	1,258*	61	1,743	2,404	3,247	9,303	130,902	100*	600*	200*	600	1,295	200*	133,897
Oct.	52,767	50,076	8,127	1,332*	509	1,693	2,564	3,355	7,500*	127,923	200*	600*	200*	600	1,500*	200*	131,223

* Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

COMPOUNDING INGREDIENTS

THE demand for compounding ingredients during December continued at the high level of preceding months, with only a slight tapering off in activity noted toward the end of the year. Most quarters anticipate still heavier demand in January, with the movement sustained through at least the first quarter of 1941.

CARBON BLACK. The demand was good with indications of a continuance through the next three months. Prices are unchanged for first quarter delivery.

FACTICE OR RUBBER SUBSTITUTE. The demand was good, and prices were steady.

LITHARGE. Carlot prices were reduced 0.30¢ per pound and smaller lots ¼¢ per pound last month. The demand was fair.

LITHOPONE. Effective January 2, the price will be advanced ¼¢ per pound. Contracting for first-quarter delivery was reported fairly brisk.

RUBBER CHEMICALS. The demand continued at a high level, with increased activity expected during January. Prices are generally steady.

RUBBER SOLVENTS. Demand for special naphthas in the rubber industry was reported to be good. Prices are firm, but unchanged.

TITANIUM PIGMENTS. Effective January 2, all grades of ordinary titanium dioxide will be advanced ½¢ per pound, except the high hiding pigment which will remain unchanged. The barium, calcium, and magnesium-base pigments will be advanced ¼¢ per pound. Deliveries continued at a high level, and good interest in new contracts was reported.

ZINC OXIDE. Lead-free pigments will be unchanged for the first quarter of 1941. The 35% and 50% leaded pigments were reduced 0.16¢ per pound last month, as a result of a weakening of pig lead. Shipments were well maintained.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.03	/$0.035
Rottenstone, domestic	*lb.*	.03	/ .035
Silica, 15	*ton*		

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	*ton*	20.00	
Litharge (commercial)	*lb.*	.08	

Accelerators, Organic

A-1	*lb.*	.24	/ .30
A-10	*lb.*	.31	/ .35
A-11	*lb.*	.52	/ .65
A-19	*lb.*	.52	/ .65
A-32	*lb.*	.70	/ .80
A-77	*lb.*	.42	/ .55
A-100	*lb.*	.42	/ .55
Accelerator 49	*lb.*	.40	/ .42
737	*lb.*	.42	/ .43
737-50	*lb.*	.25	/ .26
808	*lb.*	.70	/ .72
833	*lb.*	1.15	
Acrin	*lb.*	.60	
Aldehyde ammonia	*lb.*	.65	/ .70
Altax	*lb.*	.55	/ .60
B-J-F	*lb.*	.50	/ .55
Beutene	*lb.*	$0.70	/$0.75
Butyl Eight	*lb.*	.98	/ 1.00
Zimate	*lb.*	2.15	
C-P-B	*lb.*	2.00	
Captax	*lb.*	.50	/ .55
Crylene	*lb.*	.40	/ .47
Paste	*lb.*	.30	/ .36
D-B-A	*lb.*	2.00	
Delac A	*lb.*	.40	/ .50
O	*lb.*	.40	/ .50
P	*lb.*	.40	/ .50
Di-Esterex-N	*lb.*	.60	/ .70
DOTG (Di-ortho-tolyguanidine)	*lb.*	.44	/ .46
DPG (Diphenylguanidine)	*lb.*	.35	/ .45
El-Sixty	*lb.*	.50	/ .65
Ethylideneaniline	*lb.*	.42	/ .43
Ethyl Zimate	*lb.*	2.15	
Formaldehyde P.A.C.	*lb.*	.06	
Formaldehydeaniline	*lb.*	.31	
Formaldehyde-para-toluidine	*lb.*	.52	/ .54
Guantal	*lb.*	.40	/ .50
Hepteen	*lb.*	.35	/ .40
Base	*lb.*	1.35	/ 1.50
Hexamethylenetetramine U.S.P.	*lb.*	.39	
Technical	*lb.*	.33	
Lead oleate, No. 999	*lb.*	.135	
Witco	*lb.*	.15	
Ledate	*lb.*	2.00	
Monex	*lb.*	2.00	
Novex	*lb.*		
O-N-V	*lb.*	1.00	/ 1.10
O-X-A-F	*lb.*	.50	/ .55
Ovac	*lb.*	.50	/ .55
Oxynone	*lb.*	.64	/ .80
Para-nitroso-dimethylaniline	*lb.*	.85	
Pentex	*lb.*	1.00	/ 1.10
Flour	*lb.*	.15	/ .16
Phenex	*lb.*	.50	/ .55
Pip-Pip	*lb.*	2.50	
Pipsolene	*lb.*	1.55	/ 1.85
R-2	*lb.*	1.40	/ 1.80
R-23	*lb.*	.40	
R & H 50-D	*lb.*	.42	/ .43
Rotax	*lb.*	.60	/ .65
Safex	*lb.*	1.20	/ 1.30
Santocure	*lb.*	.80	/ 1.00
Selenac	*lb.*	2.50	
SPDX	*lb.*	.70	/ .75
A	*lb.*	.70	/ .75
Super-sulphur No. 1	*lb.*	.50	
2	*lb.*	.18	/ .20
Tetrone A	*lb.*	2.70	
Thiocarbanilide	*lb.*	.24	/ .30
Thionex	*lb.*	2.35	
Thiurad	*lb.*	2.35	
Trimene	*lb.*	.55	/ .65
Base	*lb.*	1.05	/ 1.20
Triphenylguanidine (TPG)	*lb.*	.45	
Tuads	*lb.*	2.00	
Ulto	*lb.*	1.25	/ 1.75
Ureka	*lb.*	.60	/ .75
Blend B	*lb.*	.60	/ .75
C	*lb.*	.56	/ .65
Vulcanex	*lb.*	.42	/ .43
Vulcanol	*lb.*	.85	
Z-B-X	*lb.*	2.50	
Zenite	*lb.*	.46	/ .48
A	*lb.*	.53	/ .55
B	*lb.*	.46	/ .48
Zimate	*lb.*	2.00	

Activators

Aero Ac 50	*lb.*	.46	/ .56
Barak	*lb.*	.50	
MODX	*lb.*	.30	/ .35
SL No. 10	*lb.*	.12	

Age Resisters

AgeRite Alba	*lb.*	2.00	
Exel	*lb.*	1.00	/ 1.02
Gel	*lb.*	.57	/ .59
Hipar	*lb.*	.65	/ .67
Powder	*lb.*	.52	/ .54
Resin	*lb.*	.52	/ .54
D	*lb.*	.52	/ .54
White	*lb.*	1.25	/ 1.40
Akroflex C	*lb.*	.56	/ .58
Albasan	*lb.*	.70	/ .75
Aminox	*lb.*	.52	/ .61
Antox	*lb.*	.56	
Betanox	*lb.*	.52	/ .61
Special	*lb.*	.65	/ .74
B-L-E	*lb.*	.52	/ .61
Powder	*lb.*	.65	/ .74
B-X-A	*lb.*	.52	/ .61
Copper Inhibitor X-872-A	*lb.*	1.15	
Flectol B	*lb.*	.52	/ .65
H	*lb.*	.52	/ .65
White	*lb.*	.90	/ 1.15
M-U-F	*lb.*	1.50	
Neozone (standard)	*lb.*	.63	
A	*lb.*	.52	/ .54
B	*lb.*	.63	
C	*lb.*	.52	/ .54
D	*lb.*	.52	/ .54
E	*lb.*	.63	
Oxynone	*lb.*	.64	/ .80
Parazone	*lb.*	.68	
Permalux	*lb.*	1.20	
Santoflex B	*lb.*	.52	/ .65
BX	*lb.*	.58	/ .71
Santovar A	*lb.*	1.15	/ 1.40
Solux	*lb.*	1.30	
Stabilite	*lb.*	$0.52	/$0.54
Alba	*lb.*	.70	/ .75
Thermoflex A	*lb.*	.65	/ .67
Tysonite	*lb.*	.16	
V-G-B	*lb.*	.52	/ .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70	/ 3.55
liquid, 50%	100 *lbs.*	1.95	
solid (700-*lb. drums*)	100 *lbs.*	2.30	/ 3.15

Antiscorch Materials

A-F-B	*lb.*	.35	/ .40
Antiscorch T	*lb.*	.90	
Cumar RH	*lb.*	.10	
E-S-E-N	*lb.*	.35	/ .40
R-17 Resin (*drums*)	*lb.*	.10	
RM	*lb.*	1.25	
Retarder W	*lb.*	.36	
Retardex	*lb.*	.45	/ .48
U-T-B	*lb.*	.35	/ .40

Antiseptics

Compound G-4	*lb.*		
G-11	*lb.*		

Antisun Materials

Heliozone	*lb.*	.22	/ .23
S.C.R.	*lb.*	.33	/ .35
Sunproof	*lb.*	.22	/ .27

Brake Lining Saturant

B.R.T No. 3	*lb.*	.0165/	.0175

Colors

Black

Du Pont powder	*lb.*	.42	/ .44
Lampblack (commercial), *l.c.l.*	*lb.*	.15	

Blue

Brilliant	*lb.*		
Du Pont dispersed	*lb.*	.83	/ 3.95
Powders	*lb.*	2.25	/ 3.75
Toners	*lb.*	.08	/ .385

Brown

Mapico	*lb.*	.11	

Green

Brilliant	*lb.*		
Chrome, light	*lb.*		
medium	*lb.*	.22	
oxide (*freight allowed*)	*lb.*		
Dark	*lb.*		
Du Pont Dispersed	*lb.*	.98	/ 1.75
Powders	*lb.*	1.00	/ 5.50
Guignet's (*bbls.*)	*lb.*	.70	
Light	*lb.*		
Toners	*lb.*	.85	/ 3.75

Orange

Du Pont Dispersed	*lb.*	.88	/ .98
Powders	*lb.*	.88	/ 2.75
Lake	*lb.*		
Toners	*lb.*	.40	/ 1.60

Orchid

Toners	*lb.*	1.50	/ 2.00

Pink

Toners	*lb.*	1.50	/ 2.00

Purple

Permanent	*lb.*		
Toners	*lb.*	.60	/ 2.10

Red

Antimony Crimson, 15/17%	*lb.*		
R. M. P. No. 3	*lb.*	.48	
Sulphur free	*lb.*		
R.M.P.	*lb.*	.52	
Golden 15/17%	*lb.*		
7-A	*lb.*	.37	
Z-2	*lb.*	.23	
Cadmium, light (400-*lb. bbls.*)	*lb.*	.75	/ .80
Chinese	*lb.*		
Crimson	*lb.*		
Du Pont dispersed	*lb.*	.93	/ 2.05
Powders	*lb.*	.285	/ .90
Mapico	*lb.*	.0925	
Medium	*lb.*		
Rub-Er-Red (*bbls.*)	*lb.*	.0925	
Scarlet	*lb.*	.08	/ 2.00
Toners	*lb.*	.08	/ 2.00

White

Lithopone (*bags*)	*lb.*	.0385/	.0410
Albalith	*lb.*	.0385/	.0410
Astrolith (50-*lb. bags*)	*lb.*	.0385/	.0410
Azolith	*lb.*	.0360/	.0385
Titanium Pigments			
Ray-Bar	*lb.*	.0525/	.0575
Ray-Cal	*lb.*	.05	/ .0525
Rayox	*lb.*	.13	
Titanolith (50-*lb. bags*)	*lb.*	.0525/	.055
Titanox-A	*lb.*	.135	/ .165
B	*lb.*	.055	/ .065
30	*lb.*	.055	/ .065
C	*lb.*	.0525/	.0625
M	*lb.*	.0525/	.0625
Ti-Tone	*lb.*		
Zopaque (50-*lb. bags*)	*lb.*	.135	/ .1425

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing all known ingredients. Requests for information not recorded will receive prompt attention.

Zinc Oxide			
Azo ZZZ-11	lb.	$0.065	/$0.0675
44	lb.	.065	/ .0675
55	lb.	.065	/ .0675
66	lb.	.065	/ .0675
French Process, Florence			
Green Seal-8	lb.	.0825/	.0850
Red Seal-9	lb.	.0775/	.08
White Seal-7	lb.	.0875/	.09
Kadox, Black Label-15	lb.	.065	/ .0675
No. 25	lb.	.0775/	.08
Red Label-17	lb.	.065	/ .0675
Horse Head Special 3	lb.	.065	/ .0675
XX Red-4	lb.	.065	/ .0675
23	lb.	.065	/ .0675
72	lb.	.065	/ .0675
78	lb.	.065	/ .0675
80	lb.	.065	/ .0675
103	lb.	.065	/ .0675
110	lb.	.065	/ .0675
St. Joe (lead free)			
Black Label	lb.	.065	/ .0675
Green Label	lb.	.065	/ .0675
Red Label	lb.	.065	/ .0675
U.S.P.	lb.	.0975/	.10
Zinc Sulphide Pigments			
Cryptone-BA-19	lb.	.0525/	.055
BT	lb.	.0525/	.055
CB	lb.	.0525/	.055
MS	lb.	.055	/ .0575
ZS No. 20	lb.	.075	/ .0775
86	lb.	.075	/ .0775
230	lb.	.075	/ .0775
800	lb.		
Sunolith	lb.	.0385/	.0410
Yellow			
Cadmolith (cadmium yellow), (400-lb. bbls.)	lb.	.50	/ .55
Du Pont dispersed	lb.	1.25	/ 1.75
Powders	lb.	.135	/ 2.75
Lemon	lb.		
Mapico	lb.	.0675	
Toners	lb.	2.50	

Dispersing Agents

Bardex	lb.	.0395/	.042
Bardol	lb.	.0225/	.025
Darvan	lb.	.30	/ .39
Nevoll (drums, c.l.)	lb.	.0225	
Santomerse S	lb.	.11	/ .25

Fillers, Inert

Asbestine, c.l.	ton	15.00	
Barytes	ton	30.00	/36.00
f.o.b., St. Louis (50-lb. paper bags)	ton	22.85	
off color, domestic	ton	21.50	/26.50
white, imported	ton		
Blanc fixe, dry, precip.	lb.	.03	/ .035
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.025	/ .03
Kalite No. 1	ton	24.00	/30.00
3	ton	34.00	/40.00
Kalvan	ton	95.00	
Magnesia, calcined, heavy	lb.		
Carbonate, l.c.l.	lb.	.0725/	.095
Paradene No. 2 (drums)	lb.	.045	
Pyrax A	ton	6.50	
Vinsol Resin	lb.		
Whiting			
Columbia Filler	ton	9.00	/14.00
Suprex, white extra light	ton	45.00	
heavy	ton	45.00	
Witco, c.l.	ton	6.00	

Finishes

Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd.	100 lbs.		
potato	lb.		
Talc	ton	.025	/ .035

Flock

Cotton flock, dark	lb.	.09	/ .12
dyed	lb.	.40	/ .80
white	lb.	.11	/ .19
Rayon flock, colored	lb.	.90	/ 1.50
white	lb.	.75	/ 1.00

Latex Compounding Ingredients

Accelerator 85	lb.	.35	
89	lb.	1.40	
122	lb.	1.55	
552	lb.	2.50	
Aerosol OT Aqueous 10%	lb.	.15	/ .175
Antox, dispersed	lb.	.42	
Aquarex A	lb.	.35	
D	lb.	.75	
F	lb.	.85	
WA Paste	lb.	.28	
Areskap No. 50	lb.	.18	/ .24
100, dry	lb.	.39	/ .51
Aresket No. 240	lb.	.16	/ .22
300, dry	lb.	.42	/ .50
Aresklene No. 375	lb.	.35	/ .50
400, dry	lb.	.51	/ .65
Black No. 25, dispersed	lb.	.22	/ .40
Collocarb	lb.	.07	
Color Pastes, dispersed	lb.	.35	/ 1.90
Compound G-11 NW	lb.		
Dispersex No. 15	lb.	.11	/ .12
No. 20	lb.	.08	/ .10
Emo, brown	lb.	.16	
white	lb.	.16	
Factice Compound, dispersed	lb.		9¢
Factex Dispersion A	lb.	$0.19	
Heliozone, dispersed	lb.	.25	
Igepon A	lb.		
Latac	lb		
MICRONEX, Colloidal	lb.	.055	/$0.065
Nekal BX (dry)	lb.		
Pipsol X	lb.	3.05	/ 3.55
R-2 Crystals	lb.	2.50	/ 2.75
R-23	lb.	.40	
RX-2	lb.	2.00	/ 2.25
Crystals	lb.	2.00	/ 2.25
S-1 (400 lb. drums)	lb.	.65	
Santobrite Briquettes	lb.	.17	/ .26
Powder	lb.	.16	/ .26
Santomerse D	lb.	.41	/ .65
S	lb.	.11	/ .25
No. 1	lb.	.18	/ .35
No. 2	lb.	.18	/ .35
No. 3	lb.	.40	/ .65
No. 3P	lb.	.29	/ .45
Stablex A	lb.	.90	/ 1.10
B	lb.	.65	/ .90
C	lb.	.40	/ .50
Sulphur, dispersed	lb.	.10	/ .15
No. 2	lb.	.075	
T-1 (440-lb. drums)	lb.	.40	
Tepidone	lb.	1.20	
Vulcan Colors	lb.		
Zinc oxide, dispersed	lb.	.12	/ .15

Mineral Rubber

Black Diamond	ton	25.00	
B.R.C. No. 20	lb.	.009	/ .01
Hydrocarbon, hard	ton	23.00	/27.00
Genasco Hydrocarbon, granulated	ton		
solid	ton		
Gilsonite	ton		
Parmr	ton	23.00	/27.00
Pioneer	ton		
285°-300°	ton	23.00	/42.00

Mold Lubricants

Lubrex	lb.	.25	/ .30
Mold Paste	lb.	.12	/ .18
Sericite	ton	65.00	/75.00
Soapbark	lb.		
Soapstone, l.c.l.	ton	25.00	/35.00

Oil Resistant

AXF	lb.	.40	/ .50

Reclaiming Oils

B.R.V.	lb.	.032	/ .0345
No. 1621	lb.	.019	/ .02
S.R.O.	lb.	.019	/ .02
X-159	gal.	.20	

Reenforcers

Carbon Black			
Aerfloted Arrow Specification (bags only)	lb.	.02925†	
Arrow Compact Granulized	lb.	.02925†	
Certified Heavy Compressed (bags only)	lb.	.02925†	
Spheron	lb.	.02925†	
Continental, dustless	lb.	.02925†	
Compressed (bags only)	lb.	.02925†	
Disperso	lb.	.02925†	
Dixie	lb.	.02925†	
Dixiedensed	lb.	.02925†	
66	lb.	.02925†	
Excello, dustless	lb.	.02925†	
Fumonex	lb.	.03	
Gastex	lb.	.03	/ .07
Kosmobile	lb.	.02925†	
66	lb.	.02925†	
Kosmos	lb.	.02925†	
MICRONEX Beads	lb.	.02925†	
Mark II	lb.	.02925†	
Standard	lb.	.02925†	
W-5	lb.	.02925†	
W-6	lb.	.02925†	
P-33	lb.	.0475	/ .0725
Pelletex	lb.	.03	/ .07
Supreme, dustless	lb.	.02925†	
Thermax	lb.	.02	/ .0475
Velvetex	lb.	.029	/ .034
"WYEX BLACK"	lb.	.02925†	
Carbonex	lb.	.022	/ .035
S	lb.	.03	/ .0350
Clays			
Aerfloted Paragon (50-lb. bags)	ton	10.00	
Suprex (50-lb. bags)	ton	10.00	
Barden	ton	10.00	
Catalpo, c.l.	ton	30.00	
Chicora	ton	10.00	
China	ton	22.50	
Crown	ton	10.00	
Dixie	ton	10.00	/22.50
Hi-White	ton	10.00	
Langford	ton	7.50	
McNamee	ton	10.00	/22.50
Par	ton	10.00	
Paraforce, c.l.	ton	40.00	
Witco, c.l.	ton	10.00	
Cumar EX	lb.	.045	
MH	lb.	.065	/ .11
V	lb.	.09	/ .12
Silene	lb.	.04	/ .045

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is 2.75¢ per pound; f.o.b. Hoboken (bulk), 3.63¢; f.o.b. No. Atlantic Docks (bags), 3.80¢. All prices are carlot.

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Curodex 19	lb.	$2.75	
188	lb.	3.50	
Para-Dors	lb.	4.50	
Rodo No. 0	lb.	3.50	/$4.00
10	lb.	4.50	/ 5.00
198	lb.		

Rubber Substitutes

Black	lb.	.08	/ .12
Brown	lb.	.08	/ .115
White	lb.	.085	/ .135
Factice			
Amberex	lb.	.25	
Type B	lb.	.1875	
Brown	lb.	.08	/ .115
Fac-Cel B	lb.	.135	
C	lb.	.135	
Neophax A	lb.	.09	
B	lb.	.09	
White	lb.	.085	/ .135

Softeners

B.R.T. No. 7	lb.	.0165/	.0175
Bondogen	lb.	.98	/ 1.05
Burgundy pitch	lb.	.06	
Cycline oil	gal.	.14	/ .20
Dispersing Oil No. 10	lb.	.0335/	.036
Nuba resinous pitch (drums)			
Grades No. 1 and No. 2	lb.	.0265	
Nubalene Resin	lb.	.025	
Nypene Resin	lb.	.016 /	.0165
Palm oil (Witco), c.l.	lb.		
Palmol	lb.	.12	
Para Flux	gal.	.17	/ .18
No. 2016	gal.	.19	/ .20
Para Lube	lb.	.0425/	.048
Pine tar	gal.		
Plastogen	lb.	.0775/	.08
Plastone	lb.	.27	/ .30
R-19 Resin (drums)	lb.	.10	
21 Resin (drums)	lb.	.10	
Reogen	lb.	.115	/ .18
Rosin oil, compounded	gal.	.40	
RPA No. 1	lb.	.65	
2	lb.	.65	
3	lb.	.46	
Rubtack	lb.	.10	
Tackol	lb.	.083	/ .18
Tonox	lb.	.52	/ .61
Tonox D	lb.	.75	/ .85
Witco No. 20, l.c.l.	gal.	.20	
X-1 resinous oil (tank car)	lb.	.01	

Softeners for Hard Rubber Compounding

Resin C. Pitch 45°C. M.P.	lb.	.013	/ .014
60°C. M.P.	lb.	.013	/ .014
75°C. M.P.	lb.	.013	/ .014

Solvents

Beta-Trichlorethane	gal.		
Carbon bisulphide	lb.		
tetrachloride	lb.		
Cosol No. 1	gal.	.25	/ .30
No. 2	gal.	.20	/ .28
No. 3	gal.	.20	/ .28
Industrial 90% benzol (tank car)	gal.	.14	
Skellysolve	gal.		

Stabilizers for Cure

Laurex (bags)	lb.	.1025/	.1275
Stearex B	lb.	.075	/ .085
Beads	lb.	.075	/ .085
Stearic acid, single pressed	lb.	.075	/ .085
Stearite, c.l.	lb.	.085	
Zinc stearate	lb.	.23	/ .25

Synthetic Rubber

Neoprene Type E	lb.	.65	
G	lb.	.70	
GN	lb.		
GW	lb.	.75	
H	lb.	.78	
M	lb.	.65	
Latex Type 57	lb.	.30	
Synthetic 190	lb.	.55	

Tackifier

B.R.H. No. 2	lb.	.017	/ .02
Staybelite	lb.		

Varnish

Shoe	gal.	1.45	

Vulcanizing Ingredients

Sulphur	100 lbs.	2.00	
Chloride (drums)	lb.	.035	/ .04
Telloy	lb.	1.75	
Vandex	lb.	1.75	

(See also Colors—Antimony)

Waxes

Carnauba, No. 3 chalky	lb.		
2 N.C.	lb.		
3 N.C.	lb.		
2	lb.		
1 Yellow	lb.		
Montan, crude	lb.		

RMP
ANTIMONY
FOR RED RUBBER

. . . . The utmost in pleasing appearance with no deteriorating effect whatever.

●

RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

TO PRODUCERS OF RUBBER FOOTWEAR

We are exclusive manufacturers of the Patten Air Lift Motor driven machine for cutting taps and soles from sheet rubber. This machine will cut from 3,500 to 5,000 pairs per day, producing a sole or tap with beveled edge of 27° to 90°, and is an up-to-date type of machine for this purpose.

We are now placing in the hands of our customers a new type of the above machine to which we have given the name of "Heavy Duty" designed to meet the demand for a machine capable of cutting thicker stock in Sole and Heel; using a 2 H.P. motor and a larger cylinder and piston which increase the pressure 80%. A taper clutch adds greatly to the power produced, and an improved blade gives better results in cutting the heavier stock. Although designed for heavy service, this machine is equally successful in cutting thinner stock for light shoes.

We are in position to make delivery of either type within thirty days after receipt of order.

WELLMAN COMPANY
Machinists
MEDFORD, MASS., U. S. A.

Regular and Special Constructions of

COTTON FABRICS

Single Filling **Double Filling**
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Oct. 26	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Dec. 28
Dec.	9.54	10.04	10.18	9.34	....	....
Jan.	....	....	9.96	10.11	10.06	10.02	10.18
Mar.	9.52	10.07	10.23	10.17	10.15	10.29
July	9.24	9.76	9.97	9.91	9.86	10.03
Sept.	8.97	9.42	9.59	9.55	9.51	9.66
Nov.	....	....	....	....	9.36	9.32	9.47

New York Quotations

December 23, 1940

Drills		
38-inch 2.00-yard	yd.	$0.13½
40-inch 3.47-yard		.08
50-inch 1.52-yard		.18½
52-inch 1.85-yard		.15½
52-inch 1.90-yard		.15 /.15⅛
52-inch 2.20-yard		.13¾
52-inch 2.50-yard		.12⅝
59-inch 1.85-yard		.15½
Ducks		
38-inch 2.00-yard D. F.	yd.	.14 /.14½
40-inch 1.45-yard S. F.		.19
51½-inch 1.35-yard D. F.		.20¾
72-inch 1.05-yard D. F		.28½/.29½
72-inch 17.21-ounce		.32¼
Mechanicals		
Hose and belting	lb.	.28½
Tennis		
52-inch 1.35-yard	yd.	.21⅛
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd	.10 /.10¾
30-inch No. 72		.18 /.19½
40-inch No. 72		.20 /.21½
50-inch No. 72		.28 /.29½
Red Seal and Cardinal		
20-inch	yd.	.08½/.09¼
30-inch		.15¾/.17¼
40-inch		.17 /.18½
50-inch		.26 /.27½
Osnaburgs		
40-inch 2.34-yard	yd.	.10⅞
40-inch 2.48-yard		.10¼
40-inch 2.56-yard		.09¾
40-inch 3.00-yard		.08¾
40-inch 7-ounce part waste		.09¼
40-inch 10-ounce part waste		.13
37-inch 2.42-yard		.10½
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.08
Plaids 60 x 48		.11½
Surface prints 60 x 64		.12½
Print cloth, 38½-inch, 60 x 64		.05⅜
Sheetings, 40-inch		
48 x 48, 2.50-yard	yd.	.08½
64 x 68, 3.15-yard		.08⅞
56 x 60, 3.60-yard		.07¾
44 x 40, 4.25-yard		.06
Sheetings, 36-inch		
48 x 48, 5.00-yard	yd.	.05⅛
44 x 40, 6.15-yard		.04¼
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.29½
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.29
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.28½
Cord Fabrics		
23/5/3 Karded peeler, 1/16" cotton	lb.	.30
15/3/3 Karded peeler, 1/16" cotton	lb.	.28
12/4/2 Karded peeler, 1/16" cotton	lb.	.27
23/5/3 Karded peeler, 1¼" cotton	lb.	.35½
23/5/3 Combed Egyptian	lb.	.49
Lose Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31½

COTTON prices held firm last month with increased buying from Russian sources, heavy domestic demand, and a steady movement of the season's surplus cotton into Government loan, as strengthening factors. The New York 1 1/16-inch spot middling price, after closing at 10.24¢ per pound on November 30, held firm throughout December to close at the somewhat higher level of 10.34¢ per pound on December 24. Thereafter the market was strong, and the closing price on December 30 was 10.60¢ per pound.

Production of cotton from the crop of 1940 was estimated by the Crop Reporting Board of the Department of Agriculture as of December 1 to be 12,686,000 bales, a reduction of 161,000 bales from the forecast of 12,847,000 as of November 1. The December 1 estimate was the final forecast to be issued this season.

According to the Bureau of Census, 744,088 bales of cotton were consumed by domestic mills during November, a new high for that month. This figure compares with the high figure of 770,702 bales consumed in October. November exports totaled 144,710 bales, a decline from the 194,251 bales shipped in October. Total exports for four months were 495,390, against 2,327,695 bales a year ago.

The Tariff Commission reported that President Roosevelt signed a proclamation on December 19 suspending the imports quotas on cotton having a staple length of 1 1/16 inches or more. This action was taken to obtain supplies of the long staple for the defense program. Only a few thousand bales of cotton as long as 1 1/16 inches are grown in the world.

A referendum of cotton farmers last month approved by almost a 93% margin a continuance of the Government's cotton control program in 1941.

Fabrics

The fabrics market, dominated by Government purchases for defense measures, continued active last month. A growing scarcity of cloth is evident with delivery dates moving further forward and more remote from purchase dates. The sheetings market was reported to have been relatively quiet. Raincoat manufacturers are now making up their spring lines which they expect to be ready to show about the middle of January. The market continues strong with price advances on most types of construction in the following groups: drills, ducks, hollands, and osnaburgs. Raincoat fabrics and sheetings are mainly steady, and tire fabrics are unchanged in price. The market is expected to retain its strength for the near future.

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, November reclaimed rubber consumption is estimated at 16,042 long tons, 2.9% below that of October; production, 17,689 long tons; and stocks on hand November 30, at 33,143 long tons. Consumption during December was reported to be holding up well, with increased demand anticipated for January. Footwear is said to be a very active consuming outlet for reclaim, with good demand from mechanical goods and insulated wire sources.

With higher scrap prices, the reclaim market, for the first time in over a year, showed a change. Red tube reclaim advanced ½¢ per pound; while compound tubes, which had been quoted at 9 to 10¢ per pound, are now quoted at 9 to 10¼¢ per pound. All other grades of reclaim continue steady.

New York Quotations

December 23, 1940

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6 / 6¼
Acid	1.18-1.22	7 / 7¼
Shoe		
Standard	1.56-1.60	6½/ 6¾
Tubes		
Red Tube	1.15-1.30	9½/ 9¾
Compound	1.10-1.20	9 /10¼
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	12½/14

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U.S. Stocks*†	Exports
1938	122,403	120,800	27.6	23,000	7,403
1939	186,000	170,000	28.7	25,250	12,611
1940					
Jan.	19,297	16,070	29.2	27,418	1,059
Feb.	17,992	15,370	30.8	28,602	1,436
Mar.	17,234	15,931	31.7	28,488	1,420
Apr.	16,568	16,298	32.5	27,558	977
May	17,552	15,719	30.5	28,397	866
June	16,631	14,912	32.1	29,260	1,207
July	14,342	14,298	30.4	28,058	1,232
Aug.	17,213	14,224	28.3	29,786	1,300
Sept.	16,428	14,589	29.1	30,287	1,031
Oct.	19,358	16,528	29.3	32,118	716
Nov.	17,689	16,042	29.4	33,143	...

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

Weaving St. Agnes Cloth
(from a Convent scene of the Middle Ages)

THEIR TROUBLE:
Poor Coordination

This early attempt to combine spinning and weaving operations resulted in the production of a very limited quantity of fabric whose quality varied with the operator's skill, and from piece to piece. A well organized textile unit such as our own group of 20 modern mills, places every step of production from the spinning of yarn to the finished fabric under scientific laboratory control. This complete, carefully planned organization has been developed to make possible the large scale production of highly uniform fabrics required by modern industry.

FOR INSTANCE: *Belting Duck and Other Fabrics for the Rubber Industry*

Shawmut Belting Duck

Our famous Shawmut Belting Duck has a well earned reputation for quality and performance. Like all of our fabrics used by the rubber industry, Shawmut Duck is the product of combined research and technical skill within our organization.

WELLINGTON SEARS COMPANY
65 WORTH STREET • NEW YORK, N. Y.

Patents and Trade Marks

APPLICATION

United States

21,648. (Reissue.) **Bulb-Type Hydrometer.** H. W. Mitchell, Chicago, Ill., assignor, by mesne assignments, to Stromberg Motoscope Mfg. Co., a corporation of Ill.

2,221,775. **Combination Swab and Washing Tool** with Rubber Packing Sleeves. A. Boynton, San Antonio, Tex.

2,221,801. **Rubber Holder** for Brooms, Etc. U. A. Keppinger, Portland, Oreg.

2,221,884. **Elastic Vibration-Dampener Bearing.** F. Schmidt, Harburg-Wilhelmsburg, Germany.

2,221,894. **Transmission Synchronizer** with Compressible Cushioning Blocks. S. O. White, Muncie, Ind., assignor to Borg-Warner Corp., Chicago, Ill.

2,221,913. **Rubber-Covered Hydrometer Float.** L. Edelmann, Chicago, Ill.

2,222,002. **Guard or Shield for Pick Handles.** H. P. Sewell, Montgomery, Ala.

2,222,150. **Elastic Fabric** Comprising Elastic and Non-Elastic Warps and Two Separate Sets of Wefts. T. F. Moore, assignor to George C. Moore Co., both of Westerly, R. I.

2,222,180. **Finger Exerciser.** C. T. Marsh, Vancouver, B. C., Canada.

2,222,200. **Weather Strip and Scuff Strip** for Auto Doors. H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.

2,222,246. **Inflatable Beacon Light or Life Buoy.** H. Tober, Bridgeport, Conn.

2,222,267. **Fire Extinguisher** with Resilient Containers. (Synthetic.) E. Schnabel, Berlin-Lichterfelde, Germany, assignor to Resistoflex Corp., New York, N. Y.

2,222,333. **Rubber Bed and Type Holder Therefor.** W. E. Wenzel, New City, and F. A. Kramer, Spring Valley, both in N. Y.

2,222,351. **Loom Picker with Resilient Pad.** A P. Lewis, Fairhaven, assignor to R. W. Cutler, Boston, both in Mass.

2,222,352. **Resilient Picker Stick Lug or Block.** A. P. Lewis, Fairhaven, assignor to R. W. Cutler, Boston, both in Mass.

2,222,353. **Loom Picker** with Resilient Block. A. P. Lewis, Fairhaven, assignor to R. W. Cutler, Boston, both in Mass.

2,222,371. **Liquid Withdrawal and Dispensing Means** with Resilent Closure. N. M. Nesset, assignor to Baxter Laboratories, Inc., both of Glenview, Ill.

2,222,382. **Bottle Cap Remover.** M. D. Truesdale, Fairfield, Conn.

2,222,404. **Vehicle Bumper** with Resilient Cushions. E. Cookenboo, Houston, Tex.

2,222,478. **Car Truck** with Compressible Resilient Pads. R. B. Cottrell, assignor to American Steel Foundries, both of Chicago, Ill.

2,222,491. **Sliding Bearing** with Resilient Ring. W. L. Scribner, assignor to Timken Roller Bearing Co., both of Canton, O.

2,222,531. **Foiling Device** for Wax Dentures. J. J. Dwyer, Philadelphia, Pa.

2,222,555. **Insulated Electrical Conductor** with a Jacket Comprising an Outer Helically Wound Film Material Locked with a Helically Wound Filament. W. C. Robinson, Sewickley, assignee of R. W. E. Moore, Mount Lebanon, both in Pa.

2,222,556. **Insulated Electrical Conductor** with an Outer Jacket Comprising a Wrap of Absorbent Threads Locked with an Open-Wound Single Filament of Less Absorbent Material. W. C. Robinson, Sewickley, Pa., and R. W. E. Moore, Riverdale, N. Y., assignors to National Electric Products Corp, a corporation of Del.

2,222,558. **Tractor Lug.** R. Bawden, Plough Works, South Molton, assignor to Roadless Traction, Ltd., Hounslow, Middlesex, both in England.

2,222,638. **Electric Cable** with a Sheath Containing a Rodent Repellent Material. J. A. Szilard, Rome, assignor to General Cable Corp., New York, both in N. Y.

2,222,639. **Insulated Electrical Conductor** with a Sheath Containing a Rodent Repellent Material. G. W. Pirk, Rome, assignor to General Cable Corp., New York, both in N. Y.

2,222,650. **Rubber Covered Spike** for Athletic Shoes. D. R. Brady, Highland Park, assignor, by mesne assignments, to D. R. Brady and J. W. Davis, as joint trustees for Brady Research Co., Detroit, all in Mich.

2,222,677. **Knock-down Toy Airplane** with Elastic Band Motive Power. L. Main, Verdun, P. Q., Canada, assignor to H. Freed, New York, N. Y.

2,222,687. **Woman's Undergarment Strap Construction.** W. Rosenthal, New York, and C. M. Sachs, Brooklyn, both in N. Y., assignors to Maiden Form Brassiere Co, Inc.

2,222,715. **Electrical Locking Receptacle.** A. L. Kuhlman, Ann Arbor, Mich.

2,222,757. **Device to Depict Characters.** L. Budd, Brooklyn, N. Y.

2,222,846. **Well Packer** with Rubber Sleeve. M. O. Johnston, Los Angeles, Calif.

2,222,852. **Fluid Dispenser.** T. W. Miller, assignor to Faultless Rubber Co., both of Ashland, O.

2,222,944. **Tassel Trimming** for Drapes, Etc., Comprising Elastic Binding Embracing Groups of Loose Strands between the Ends Thereof. J. Gerson, Newark, N. J., assignor to H. Rubin, New York, N. Y.

2,222,956. **Paper** Coated with Plasticized Polyvinyl Chloride. (Synthetic.) J. H. Seaton, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,222,970. **Joint Structure** for Walls. V. V. Malcolm, Mariemont, O., assignor to Philip Carey Mfg. Co., a corporation of O.

2,222,971. **Breathing Apparatus.** T. F. Wright, Rochester, N. Y.

2,223,007. **Safety Inner Tube or Tire** with Plurality of Compartments. H. Legowsky and C. Menzies, both of Detroit, Mich.

2,223,017. **Tamperproof Container Sealing Strip** of Wax-Rubber Composition. A. Abrams and G. W. Forcey, both of Wausau, Wis., and C. A. Sheldon, Bronxville, N. Y., assignors to Marathon Paper Mills Co., Rothschild, Wis.

2,223,028. **Typewriter Sound Dampening Support.** W. A. Dobson, Wethersfield, Conn., assignor to Underwood Elliott Fisher Co., New York, N. Y.

2,223,073. **Composite Sole.** F. H. Martin, Belmont, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,223,154. **Electric Immersion Heater** for Hot Water Bottles. G. Thornton-Norris, assignor to Quadrant Electric Co., Ltd., both of London, England.

2,223,157. **Garment** with Elastic Waistband. H. Berger, New York, N. Y.

2,223,179. **Nursing Nipple.** V. Lougheed, Lucketts, Va.

2,223,216. **Girdle Garter.** R. Linder, Upper Darby, Pa.

2,223,263. **Massaging Device.** J. W. Michaelson, Misswa, assignor to Miracle Massage Appliances, Inc., Minneapolis, both in Minn.

2,223,309. **Exerciser.** J. Swanson, Chicago, Ill.

2,223,339. **Low Shoe** with Extended Lining Made Snug by an Elastic Strip. V. De Liso, Astoria, Long Island, N. Y.

2,223,412. **Comforter Anchor** with Elastic Band Holders. G. W. Gartz, Newark, N. J., assignor to Burton-Dixie Corp., Chicago, Ill.

2,223,447. **Short-Wave Radio Therapy System.** J. L. Hathaway, Manhasset, N. Y., assignor to Radio Corp. of America, a corporation of Del.

2,223,455. **Shaker Mechanism** for Fruit and Vegetable Grader with Resilient Bearing. A. B. McLauchlan, Salem, Oreg.

2,223,483. **Thermo Hydrometer.** L. Edelmann, Chicago, Ill.

2,223,511. **Wringer Roll Drive Mechanism.** N. L. Etten, assignor to Chamberlain Corp., both of Waterloo, Ia.

2,223,512. **Wringer Release and Reset.** N. L. Etten, Waterloo, Ia.

2,223,570. **Apparatus to Produce Artificial Respiration.** R. M. McMillin, Detroit, Mich.

2,223,611. **Syringe.** R. E. Gross, Oakland, Calif.

2,223,625. **Pneumatic Boat.** H. Krupp, Seattle, Wash.

2,223,627. **Combined Mounting and Elastic-Banded Closure** for Handbag Purses. G. Landberg, Bronx, N. Y.

2,223,636. **Valve.** T. W. Mullen, assignor to Bowes Seal Fast Corp., both of Indianapolis, Ind.

2,223,638. **Buffing Head.** E. G. Peterson, Rockford, Ill.

2,223,653. **Pump Shoulder Liner** with Rubber Lining. F. B. Allen, Lower Merion Township, assignor to Allen-Sherman-Hoff Co., Philadelphia, both in Pa.

2,223,660. **Windshield Cleaner.** E. C. Horton, Hamburg, assignor to Trico Products Corp., Buffalo, both in N. Y.

2,223,665. **Elastic Material and Its Embodiment in Wearing Apparel.** L. R. Thun, State Hill, assignor to Narrow Fabric Co., West Reading, both in Pa.

2,223,719. **Elastic-Topped Hosiery.** R. E. Davis, Jr., Fort Payne, Ala., assignor to Interwoven Stocking Co., New Brunswick, N. J.

2,223,749. **Elastic-Topped Rib Knit Hosiery.** P. L. Thurston, Martinsburg, W. Va., and L. B. Wilcox, Westfield, assignors to Interwoven Stocking Co., New Brunswick, both in N. J.

2,223,808. **Hosiery** with External Welts Incorporating Elastic Yarn. J. D. Rambo, assignor to Rambo & Regar, Inc., both of Norristown, Pa.

2,223,855. **Land and Water Vehicle.** G. E. Powell, Glendale, Calif.

2,223,857. **Picker** for Mechanical Looms. J. Prina and E. Delzar, both of Buenos Aires, Argentina.

2,223,858. **Washing and Rinsing Machine.** A. Schellenberg, Joliet, Ill.

2,223,859. **Gas Meter Connecting Device.** K. A. Scharbau, assignor, by mesne assignments, to Eclipse Fuel Engineering Co., both of Rockford, Ill.

2,223,860. **Multiple Roll Wringer.** A. Schellenberg, Joliet, Ill.

2,223,872. **Self-Alining Bearing.** J. F. McWhorter, Willoughby, and M. W. Humphreys, Euclid, assignors to Ohio Rubber Co., Willoughby, all in O.

2,223,921. **Eraser.** E. Rüdiger, Berlin, Germany.

2,223,944. **Check Valve.** A. E. Roy, Los Angeles, Calif.

2,223,993. **Pneumatic-Tired Vehicle Traction Plow.** M. K. Jessup, Grosse Pointe Park, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,224,018. **Syringe.** E. Holtman, assignor to Durex Products, Inc., both of New York, N. Y.

2,224,036. **Garter.** G. S. Van Voorhis, assignor to United Elastic Corp., both of Easthampton, Mass.

2,224,066. **Tire** with Inner Buffer. R. B. Shore, assignor of 49/100 to E. Nelson, both of Oelwein, Ia.

2,224,068. **Articulated Driving Belt or Chain** for Use with V-Groove Pulleys. W. Tögel, Cologne, assignor to Koeln Factory of Wilhelm Quester, Cologne-Suelz, both in Germany.

2,224,103. **Exerciser.** R. E. Nilson, assignor of ½ to H. C. Wheeler, both of Boston, Mass.

2,224,141. **Non-Skid Tire.** E. Clark, East Orange, N. J.

2,224,253. **Dress Shield Supporter.** E. R. Clark, Springfield, assignor of ½ to F. H. Clark, Toledo, both in O.

2,224,286. **Cotton Picker** with V-Belt Drive. C. R. Berry, assignor of ½ to H. A. Gamble, both of Greenville, Miss.

2,224,307. **Electrolytic Condenser.** L. Linder, Berlin-Spandau, Germany.

2,224,331. **Inking Mechanism** for Rotary Steel Plate Printing Machine. A. A. Wittnebel, New Rochelle, assignor to American Bank Note Co., New York, both in N. Y.

2,224,445. **Exercise Appliance.** F. W. Parker, Fianigan, Nev.

2,224,465. **Flexible Coupling.** O. Wulfert, assignor to Wagner Electric Corp., both of St. Louis, Mo.

2,224,547. **Electrical Range Connecter.** L. Ludwig, Brooklyn, N. Y.

2,224,554. **Rubber Highway Marker.** T. W. Stedman, assignor to Resilient Products Corp., both of New York, N. Y.

2,224,637. **Chocolate-Flavored Chewing Gum.** L. W. Mahle. Melrose Park, assignor to Frank H. Fleer Corp., Philadelphia, both in Pa.

2,224,650. **Toy Submarine** with Bladder in Ballast Tank. D. E. J. Holloway, Westmount, P. Q., Canada.

2,224,684. **Girdle.** A. Jacobs and J. Ciringione, assignors to Poisefair Co., Inc., all of New York, N. Y.

2,224,752. **Garment Pocket.** T. S. Tworoger, Gloversville, N. Y.

2,224,871. **Elastic Girdle.** E. C. Kennedy, Bronx, assignor to Vawne Foundations, Inc., New York, both in N. Y.

2,224,937. **Highway Marker and Method of Securing Same to Highway.** T. W. Stedman, assignor to Resilient Products Corp., both of New York, N. Y.

2,224,950. **Elastic-Edged Cover** for Lamp Shade Frames. A. Burke, New York, N. Y.

2,225,042. **Tire Casing and Structure of Fabric Plies.** W. H. Elliott, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,225,067. **Door Check.** J. M. Marin, Beverly Hills, Calif.

2,225,081. **Pump Valve** with Rubber-Steel Disk. J. J. O'Hare, North Brookfield, Mass., assignor to Voorhees Rubber Mfg. Co., Inc., New York, N. Y.

2,225,093. **Typewriter Support** with Rubber Supporting Foot. H. A. Avery, Groton, assignor to L C Smith & Corona Typewriters, Inc., Syracuse, both in N. Y.

2,225,101. **Sponge Rubber Fountain Brush** for Washing Automobiles. C. H. Conk and J. I. Reinbold, Los Angeles, Calif.

2,225,183. **Balloon Attachment** for Incandescent Lamps. R. D. Schnoor, Chicago, Ill.

2,225,201. **Apparatus to Administer Anesthesia.** E. E. W. Anderson, Lidingo, assignor to Svenska Aktiebolaget Gassaccumulator, Stockholm, both in Sweden.

2,225,213. **Golf Ball** with Two Elastic Thread Layers of Different Tension. J. R. Gammeter, Akron, O.

2,225,241. **Projecting Device for Games.** F. R. Stearns, assignor to Carrom Co., both of Ludington, Mich.

2,225,277. **Hosiery** with Elastic Section. O. H. Pons, assignor to Pilot Full Fashion Mills, Inc., both of Valdese, N. C.

2,225,331. **Rubber Bristled Toothbrush.** C. M. Campbell, assignor to P. Campbell, both of New York, N. Y.

2,225,395. **Exhalation Valve** for Gas Masks. P. E. Young, Fairhaven, Mass., assignor to Acushnett Process Co., a corporation of Mass.

2,225,417. **Jar Mill Cushioning and Centering Device.** H. F. Kleinfeldt, Bloomfield, N. J., assignor to Abbé Engineering Co., Inc., New York, N. Y.

2,225,418. **Car Coupler.** E. A. Larsson, assignor to Ohio Brass Co., both of Mansfield, O.
2,225,432. **Squeegee.** C. Ginsberg, Shaker Heights, O.
2,225,470. **Wringer Rolls** with Selective Automatic Overload Release. N. L. Etten, Waterloo, O., and A. J. Snow, Wilmette, Ill.
2,225,472. **Wire Supporting Bushing.** A. W. Franklin, New York, N. Y.
2,225,496. **Marking Device** for Road Surfaces. E. L. Gethin, Morden, and G. D. Worthington, New Malden, both in England.
2,225,499. **Wringer.** W. L. Kauffman, II, assignor to Lovell Mfg. Co., both of Erie, Pa.
2,225,523. **Road Marking Device** with Endless Rubber Treads. A. L. Lundquist, Port Arthur, Tex.
2,225,540. **Powder Container and Sponge Rubber Applicator.** U. C. Tainton, Baltimore, Md.
2,225,593. **Transformer Winding Support.** D. G. McArn, Pittsburgh, Pa., assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis.
2,225,595. **Pneumatic Tire Structure** with Tread Having an Inner Zone of Cushioning Rubber. H. P. Schrank, Munroe Falls, assignor to Seiberling Rubber Co., Barberton, both in O.

Dominion of Canada

392,409. **Foundation Garment.** L. J. A. Amyot, Quebec, P. Q.
392,441. **Liquid Dispenser.** S. F. Boswer & Co., Inc., assignee of W. M Carroll, both of Fort Wayne, Ind., U. S. A.
392,442. **Graining Machine** for Offset Printing. Briggs Mfg. Co., assignee of H. J. Pattison, both of Detroit, Mich.
392,504. **Shoe Edge-Setting Machine Resiliently Mounted.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of L. E. Topham, Boston, Mass., U. S. A.
392,516. **Window Rubber Mounting.** Yellow Truck & Coach Mfg. Co., assignee of F. R. Eichner, both of Pontiac, Mich., U. S. A.
392,517. **Window Connecter Strip.** Yellow Truck & Coach Mfg. Co., assignee of F. R. Eichner, both of Pontiac, Mich., U. S. A.
392,522. **Orthopedic Sock** for Footwear. A. Fisch, Guelph, Ont.
392,532. **Foot Supporter** in Shoes. J. and W. B. Trick, co-inventors, both of Vancouver, B. C.
392,563. **Electrolytic Condenser.** Aerovox Corp., assignee of D. Jacobs, both of Brooklyn, N. Y., U. S. A.
392,599. **Loom Picker.** Dayton Rubber Mfg. Co., assignee of H. M. Bacon, both of Dayton, O., U. S. A.
392,611. **Slip Clutch Device** for Propeller Assembly. General Motors Corp., Detroit, Mich., assignee of R. C. Yantis, Dayton, O., both in U. S. A.
392,629. **Proportioning Apparatus.** Proportioneers, Inc., assignee of J. Corydon and R. Lowe, co-inventors, all of Providence, R. I., U. S. A.
392,638. **Heel Breast Covering Clamping Device.** Selby Shoes, Ltd., Montreal, P. Q., assignee of G. F. Lybrook, South Portsmouth, Ky., U. S. A.
392,650. **Foundation Garment.** Vogue Mfg. Co., Newark, N. J., assignee of E. R. Kaupp, Forest Hills, L. I., N. Y., both in the U. S. A.
392,672. **Axle or Shaft Packing.** (Synthetic.) Aschslager-Syndikat, Berlin, assignee of F. Pesarese, Berlin-Wilmersdorf, both in Germany.
392,723. **Eye Lash Curler.** Lee Sager, New York, N. Y., U. S. A.
392,766. **Laminated Elastic Textile Fabric.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. Vamos, New York, N. Y., U. S. A.
392,783. **Electrolytic Sheet Metal Anode** with Protective Rubber Band. Houdaille-Hershey Corp., assignee of W. L. Pinner, both of Detroit, Mich., U. S. A.
392,787. **Skirted Foundation Undergarment.** La Resista Corset Co., assignee of H. L. Jasper, both of Bridgeport, Conn., U. S. A.
392,866. **Measured-Quantity Atomizer** with Rubber Bulb. T. H. Robertshaw, Cardiff, Wales.
392,901, 392,902, and 392,903. **Vehicle Suspension.** Firestone Tire & Rubber Co., assignee of R. W. Brown, both of Akron, O., U. S. A.
393,003. **Trouble Detecter** for Electric Circuits. C. Mantilla, New York, N. Y., U. S. A.
393,007. **Self-Inflating Tire Tube.** A. C. Smith, La Grange, Tex., U. S. A.
393,025. **Electrical Cable** Utilizing a Jacket of Plasticized Polyvinyl Chloride. (Synthetic.) Canadian General Electric Co., Ltd., Toronto, Ont., assignee of M. M. Safford, Schenectady, N. Y., U. S. A.
393,063. **Tire Valve Stem.** Dill Mfg. Co., Cleveland, assignee of A. E. Bronson, Shaker Heights, both in O., U. S. A.
393,079. **Machinery Packing.** Garlock Packing Co., assignee of C. R. Hubbard, both of Palmyra, N. Y., U. S. A.
393,108. **Railway Train Sander** Utilizing Rubber Valve Seat. New York Air Brake Co., New York, assignee of C. A. Campbell and L. A. Safford, co-inventors, both of Watertown, all in N. Y., U. S. A.
393,136. **Inductive Device** for Communication Cable. Western Electric Co., Inc., New York, N. Y., assignee of R. M. C. Greenidge, Chatham, N. J., both in the U. S. A.
393,158. **Sandal** with Rubber Ground Sole. E. Schüller, London, England.

United Kingdom

527,015. **Pneumatic Tire Treads.** Dunlop Rubber Co., Ltd., and J. A. Attwood.
527,022. **Rubber and Like Articles.** Semperit Oesterreichische-Amerikanische Gummiwerke A. G.
527,027. **Electric Power Cables.** W. H. Duncan.
527,046. **Gloves.** E. I. W. Bogard.
527,169. **Footwear and Gloves.** Helsingborgs Gummifabriks Aktiebolag.
527,287. **Couplings.** A. E. Lake.
527,298. **Adhesive Sheet or Tape Material.** Durex Abrasives, Ltd., and C. H. Corwin.
527,482. **Clothes Wringers.** British Thomson-Houston Co., Ltd.
527,562. **Massage Apparatus.** R. Pohlman.
527,569. **Shaft Packings.** British Thomson-Houston Co., Ltd.
527,570. **Electric Insulating Material.** British Thomson-Houston Co., Ltd.
527,704. **Adhesives.** Henkel & Cie, Ges.
527,734. **Insulated Electric Cables.** Standard Telephones & Cables, Ltd., T. R. Scott, J. K. Webb, and J. F. Morley.
527,895. **Resilient Supports** for Use between Relatively Movable Members. Firestone Tire & Rubber Co., Ltd.
527,951. **Gas Expanded Materials.** Expanded Rubber Co., Ltd., and A. Cooper.
527,989. **Tires** for Vehicle Wheels. J. V. Martin.
527,995. **Pneumatic Tire Covers** for Vehicle Wheels. Soc. Italiana Pirelli.
527,998. **Windscreen Wipers.** Trico Products Corp.
528,429. **Repair Patches** for Cycle and the Like Tires. L. T. Goodman, T. J. Whall, and John Bull Rubber Co., Ltd.
528,487. **Inner Sole** Having Resilient Insert. M. Margolin.
528,556. **Wringers, Etc.** Lovell Mfg. Co.
528,622. **Highway Markers.** Resilient Products Corp.

PROCESS

United States

2,215,996. **Electrically Insulating a Conductor.** K. H. Benton, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.
2,221,984. **Rubberized Belting** with Surface Indentations. H. McKay, Belmont, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.
2,223,362. **Reclaiming Reenforcing Rings** from Tire Beads by Submerging in Water at 245 to 360° C., under Pressure. A. G. Federman, Chester, Pa.
2,224,017. **Rubber Hydrochloride Container.** I. Gurwick, assignor to Shellmar Products Co., both of Mt. Vernon, O.

Dominion of Canada

392,827. **Cellular Laminated Material.** (Latex.) C. J. McKinney, Detroit, Mich., inventor, and J. S. Reid, Cleveland, O., assignee of ½ the interest, both in the U. S. A.
392,834. **Cut Rubber Thread.** Easthampton Rubber Thread Co., assignee of K. R. Shaw, both of Easthampton, Mass., U. S. A.
393,069. **Treating Sandwich-Type Rubber Mounting** to Reduce Drift under Load by Heating the Rubber When Stressed Parallel to Its Normal Load Sustaining Direction. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. A. Merrill, Detroit, Mich., U. S. A.
393,152. **Polyvinylchloride Process** Which Comprises Cooling a Solution of After-Chlorinated Polyvinyl Chloride to 0° to 40° C. until It Gelatinizes, Introducing through a Nozzle into a Bath of Cooled Methanol, Withdrawing the Shaped Product from the Precipitating Bath, and Drying. (Synthetic.) I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of C. Schönburg, Bitterfeld, both in Germany.

United Kingdom

527,417. **Reclaiming of Rubber** from Vulcanized Products. A. Carpmael, (I. G. Farbenindustrie A.G.).
527,736. **Gas Expanded Rubber Material or Rubber-Like Material.** Expanded Rubber Co., Ltd., and A. Cooper.
527,763. **Electric Cables.** J. C. Swallow, N. W. Perrin, and Imperial Chemical Industries, Ltd.
528,196. **Reclamation of Waste Rubber.** Rubber Improvement, Ltd., and J. and S. C. Lewis.
528,319. **Regeneration of Caoutchouc.** H. and O. Ghez.
528,335. **Pneumatic Tires.** Dunlop Rubber Co., Ltd., H. Willshaw, and H. Smith.
528,435. **Coating Fabrics.** International Latex Processes, Ltd.

MACHINERY

United States

2,215,976. **Mixing Apparatus and Method of Mixing.** T. Robinson, Smithtown, N. Y.
2,222,590. **Apparatus to Roll Beads** on Thin Dipped Rubber Articles. W. A. Brubaker, Akron, assignor of 37½% to Frank B. Killian, Doylestown, 37½% to J. Tyrrell, trustee, Akron, and 25% to P. H. Stevens, Akron, all in O.
2,222,732. **Press** with Pressure Fluid Actuated Motor for Producing Relative Movement between the Opposed Press Heads. E. M. Winegar, assignor to Ohio Rubber Co., both of Willoughby, O.
2,222,755. **Apparatus to Mold a Rubber Valve Stem with a Metal Insert.** F. H. Watson, Jonesboro, Ark., assignor to Jenkins Bros., Bridgeport, Conn.
2,223,019. **Apparatus and Mold to Make Playing Ball Centers.** J. R. Gammeter, Akron, O., assignor to General Sports, Inc., Chicago, Ill.
2,223,057. **Apparatus and Process for Forming Tubing.** (Latex.) R. Bösel, Fallingbostel, and A. Seib, Mannheim, both in Germany, assignors to Sylvania Industrial Corp., Fredericksburg, Va.
2,223,223. **Hydraulic Press** with Overstroke Preventing Means. J. A. Muller, Mt. Gilead, O., assignor to Hydraulic Press Corp., Inc., Wilmington, Del.
2,223,281. **Hydraulic Press and Control System.** R. W. Dinzl, Narberth, Pa., assignor, by mesne assignments, to Baldwin Locomotive Works, a corporation of Pa.
2,224,110. **Rubber Thread Cover.** S. R. Walsh, Valley Falls, R. I., assignor to H & B American Machine Co., a corporation of Me.
2,224,336. **Vulcanizing Press.** H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.
2,224,337. **Tire Mold and Method of Making Same.** H. C. Bostwick, Akron, O., assignor to Akron Standard Mold Co., a corporation of O.
2,224,363. **Apparatus and Method for Covering Balls with a Rubber Envelope.** W. J. Voit, Los Angeles, assignee of L. C. Weimer, Southgate, both in Calif.
2,224,430. **Apparatus to Form Sticks of Chewing Gum, Etc.** F. A. Garbutt, Los Angeles, Calif.

Dominion of Canada

392,466. **Covered Elastic Yarn Making Apparatus.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of F. D. Chittenden, Rumford, and K. J. Rupprecht, Barrington, co-inventors, both in R. I., U. S. A.
392,468. **Covered Elastic Yarn Making Machine.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of F. D. Chittenden, Rumford, and H. Manchester, Providence, co-inventors, both in R. I., U. S. A.
392,669. **Endless Conveyer** for Thin Dipped Rubber Article Manufacture. (Latex.) F. B. Killian & Co., a partnership composed of F. B. Killian, P. H. Stevens, and J. Tyrrell, trustee, assignee of F. B. Killian, trustee, assignee of Latex Holding Co., assignee of F. B. Killian, executor of the estate of F. L. Killian, deceased, in his lifetime of Akron, all of Akron, O., U. S. A.
392,741, 392,742, and 392,743. **Prefill Valve** for Hydraulic Presses. E. W. Bliss Co., New York, assignee of E. Cannon, Rockville Centre, both in N. Y., U. S. A.

Germany

696,912. **Tire Vulcanizing Mold.** Continental Gummi-Werke A.G., Hannover.
697,536. **Hollow Core for Shaping Seamless Hose with Knitted Cover.** Gummiwerk Kubler G.m.b.H., Berlin-Reinickendorf.
697,675. **Nozzle for Forcing Machines.** Chemische Werke A.G. Postlerit-Werke, Dresden.
698,028. **Sectional Vulcanizing Mold.** Clemens A. Voigt, Berlin.
698,292. **Device to Feed Rubber Thread** on Circular Knitting Machines. Schubert & Salzer Maschinenfabrik A.G., Chemnitz.
698,573. **Mold** for Making Gas Masks of Leather or Leather-Like Synthetic Materials. Dragerwerk Heinr. and Bernh. Drager, Lubeck.

United Kingdom

527,063. **Apparatus and Method of Producing Rubber Threads, Strips, Etc.,** Firestone Tire & Rubber Co., Ltd.
527,083. **Apparatus to Shape Hollow Distensible Structures.** Firestone Tire & Rubber Co., Ltd.
527,174. **Presses** for Making Molded Articles. J. Shaw & Sons (Salford), Ltd., and J. B. Shaw.
527,406. **Appliances to Mold Balls and Similar Hollow Rubber Articles.** A. E. P. Milner and Swift Tennis Ball Co. Proprietary, Ltd.
528,210. **Calendering Apparatus and the Like.** W. G. Cleghorn.
528,264. **Apparatus and Methods of Splicing Rubber Articles.** Wingfoot Corp.
528,340. **Apparatus and Methods of Forming Rub-**

ber Articles from Latex. Firestone Tire & Rubber Co., Ltd.
528,341. **Thread Cover.** Firestone Tire & Rubber Co., Ltd.
528,342. **Apparatus for Producing Continuous Rubber Articles.** Firestone Tire & Rubber Co., Ltd.
528,366. **Machines for Preparing Pneumatic Tires for Re-rubbering.** N. T. J. Collmann.
528,539. **Apparatus and Methods of Splicing Unvulcanized Rubber Tubes.** Firestone Tire & Rubber Co., Ltd.
528,671. **Calenders** for the Production of Sheets of Caoutchouc and Similar Materials. H. Meyer.

CHEMICAL

United States

2,221,941. **Reaction of Vinylacetylene with Hydrogen Chloride** in Such a Manner as to Prevent Formation of Substantial Amounts of Products Other Than 2-Chloro-1,3-Butadiene. (Synthetic.) A. S. Carter, Wilmington, Del., and F. B. Downing, Carneys Point, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,222,345. **Lacquer Raw Materials** Prepared by Chlorinating Plastic and Polymerizates of Butadiene Hydrocarbons. A. Blömer, Wiembach, and W. Becker, Cologne-Mulheim, assignors to I. G. Farbenindustrie A.G., Frankfurt a.M., all in Germany.
2,222,354. **Accelerator**—Reaction Product of an Aldehyde and an Ammonium or Amine Salt of a Carboxylic Acid. J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,222,355 **Powdered or Granulated Rubber** Prepared by Dispersing Rubber and Compounding Ingredients in a Rubber Solvent Capable of Being Steam Distilled, Emulsifying Solution in Water, and Applying Heat to Remove Solvent and Partially Cure the Rubber. J. A. Merrill, assignor to Wingfoot Corp., both of Akron, O.
2,222,357. **Preparation of Tetrahydro Aryl-Alkyl Ketones** by Reacting a Butadiene with an Alkyl Vinyl Ketone. W. D. Wolfe, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,222,394. **Producing Monovinyl Acetylene** by Passing Acetylene through a Liquid-Free Catalyst Bed Containing a Cuprous Salt, a Water-Soluble Salt of Another Second-Group Metal, and a Basic-Nitrogen Compound. (Synthetic.) H. Berg and H. Heim, both of Burghausen, and F. Leiss, assignors to Alexander Wacker Gesellschaft für Electrochemische Industrie, G.m.b.H., both of Munich, all in Germany.
2,222,490. **Composition of a Polyvinyl Partial Acetal Resin and a Plasticizer** Having an Elongation in Excess of about 200% and a Tensile Strength above about 2,000 Pounds per Square Inch. (Synthetic.) H. F. Robertson, Coraopolis, Pa., assignor to Carbide & Carbon Chemical Corp., a corporation of N. Y.
2,222,783. **Spinning Solution** for Rubber Threads Comprising an Aqueous Dispersion of Rubber of Definite Viscosity, Containing 0.05 to 0.5% Casein on the Rubber, together with Zinc Oxide, Sulphur, and an Accelerator Mixture Including a Mercaptan and a Guanidine. (Latex.) R. P. Roberts, and R. McVane Dingley, both of Spondon, England, assignors to Celanese Corp. of America, a corporation of Del.
2,222,867. **Vulcanizing Rubber** with Sulphur in the Presence of a Thiazole Accelerator and a Thioglyoxaline or a Reduced Thioglyoxaline. S. M. Evans, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.
2,222,928. **Polyvinyl Halide Compositions.** (Synthetic.) C. H. Alexander, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,222,967. **Synthetic Rubber Copolymers of Butadiene** Prepared by Polymerization in Aqueous Emulsion, Employing as Emulsifying Agents Water Soluble Reaction Products of Compounds Containing an Ethylene Oxide Linkage and Water Insoluble Organic Hydroxy Compounds with a Higher Aliphatic Radical, and Working at a pH-Value below 7. H. Wollthan and W. Becker, both of Cologne, Germany, assignors, by mesne assignments, to Jasco, Inc., a corporation of La.
2,223,042. **Making 1,1'-Dithio Bis Arylenethiazoles.** W. E. Messer, Cheshire, Conn., assignor to United States Rubber Co., New York, N. Y.
2,223,085. **Plasticizing Rubber** by Subjecting It to the Action of Benzoyl Disulphide in the Absence of More Than about 3% Sulphur and in the Absence of Sufficient Basic Material to Neutralize the Action of the Benzoyl Disulphide. I. Williams, Borger, Tex., and C. C. Smith, deceased, late of Carneys Point, N. J., by L. L. Logan Smith, executrix, Carneys Point, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,223,171. **Rubber Substitute** Comprising a Hard, Brittle, High Molecular Weight Unvulcanized Vinyl Polymer Having a Polymerization Inhibitor Dispersed Therein. (Synthetic.) P. J. Gaylor, Staten Island, N. Y., assignor to Standard Oil Development Co., a corporation of Del.
2,223,446. **Vulcanizing Rubber** with Sulphur and a Mercaptothiazole Accelerator in the Presence of a Primary Cyclohexylamine Salt of a Fatty Acid. M. W. Harman, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.
2,223,488. **Accelerator** — Compound of Formula R'—S—CH_2—R, Where R is a Polynuclear Aromatic Hydroxide Selected from the Naphthalene and Quinoline Series, and Where R' Is an Aryl Thiazol Radical, of the Benzene and Naphthalene Series. M. W. Harman, Nitro, W. Va., assignor to Monsanto Chemical Co., St. Louis, Mo.
2,224,679. **Bonding Artificial Cellulosic Cords and Fabrics to Rubber** by Means of an Aqueous Solution Containing Tannin and an Aldehyde. A. Hershberger, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,224,912. **Production of Butadiene**—by Heating a Monocarboxylic Acid Ester of 2,3-Butylene Glycol in Vapor Phase at 475 to 600° C. (Synthetic.) R. Hill and E. Isaacs, both of Blackley, Manchester, England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.
2,225,256. **Coating Composition** — Comprising a Heat Hardening Urea-Formaldehyde Resin and from about 0.05 to 4.5% of Chlorinated Rubber. W. P. Colio, Rutledge, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,225,303. **Acid and Alkali Resistant Paint Composition** Comprising Two to Ten Pounds of Finely Divided Leafed Lead and from 0.4 Pound to Two Pounds of Chlorinated Rubber per Gallon. J. W. Iliff, Springfield, and W. F. Singleton, Philadelphia, both in Pa., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
2,225,368. **Preparing Nuclear Substituted Diarylamines** by Reacting Diphenylamine with a Dialkyl Ether in the Presence of an Acidic Condensation Catalyst. D. Craig, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,225,471. **Stabilization of Styrene during Storage** without Affecting Rate of Polymerization. (Synthetic.) S. G. Foord, London, England, assignor to International Standard Electric Corp., New York, N. Y.

Dominion of Canada

392,794. **Antioxidant** — Compound of Formula $RaYbC_6H_{4-(a+b)}OH_2$, where R Is a Hydrocarbon Radical of Less than Eight Carbon Atoms and Y Is Hydrogen or a Halogen, and a and b Are Integers Whose Sum Is less than 5. Monsanto Chemical Co., St. Louis, Mo., assignee of R. L. Sibley, Nitro, W. Va., both in the U. S. A.
392,908. **Plasticizer for Polyvinyl Chloride.** (Synthetic.) B. F. Goodrich Co., New York, N. Y., assignee of C. H. Alexander, Cuyahoga Falls, O., both in the U. S. A.
392,925. **Adhesive Composition**—Comprising a Solution of Rubber in a Volatile Solvent, the Rubber Containing Swollen Powdered Colloidal Material (Bentonite) to Render Composition Sprayable without Cobwebbing. Patent & Licensing Corp., New York, N. Y., assignee of E. O. Groskopf, Rutherford, N. J., both in the U. S. A.
392,969. **Aqueous Dispersions of Polyisobutylene** Produced by Dispersing in Water in the Presence of an Emulsifying Agent and Water Soluble Organic Solvent, Solutions of the Polyisobutylene in Water Insoluble Organic Solvents. I. G. Farbenindustrie A.G., Frankfurt a.M., assignee of W. Daniel and M. Otto, co-inventors, both of Ludwigshafen-on-Rhine, all in Germany.
393,066. **Antioxidant** — Compound of Formula $(RO)_nX$, Where X Is a Boron-Containing Radical (–$B(OH)_2$, =B–OH, =B, or –B=O–), R an Amino-Substituted Aryl Nucleus, and N an Integer from 1 to 3. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.
393,067. **Antioxidant** — A Secondary Aromatic Amino Compound at Least One of the Hydrogens of at Least One of the Aromatic Groups Being Substituted by an Alkenyl-Oxy Group. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.
393,068. **Antioxidant**—a Methallyloxy Diarylamine. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.

United Kingdom

527,219. **Concentrating, Purifying, and Separating Colloidal Dispersions** or the Like in the Electric Field. Semperit Oesterreichisch-Amerikanische Gummiwerke A. G.
527,883. **Lacquer Compositions** Comprising Chlorinated Rubber. L. Mellersh-Jackson, (Hercules Powder Co.).
527,935. **Reaction Products of Rubber, and Solutions of Such Products.** Manchester Oxide Co., Ltd., J. H. Clayton, and B. Bann.

UNCLASSIFIED

United States

2,221,747. **Wheel and Tire Balance Weight.** E. W. Turner, Kokomo, Ind., assignor of ⅓ to E. E. Turner, ⅓ to E. W. Turner, trustee for J. E. Turner, ⅓ to E. W. Turner, trustee for H. C. Turner, and ⅓ to E. W. Turner.
2,221,838. **Non-Skid Device** for Automobile Tires. C. B. Kane, Greenwich, Conn.
2,222,036. **Tire Groover.** E. P. Koppin, Ypsilanti, and E. E. Staub, Detroit, both in Mich., assignors to Allied Manufacturers, Inc., a corporation of Mich.
2,222,047. **Apparatus to Remove Liquid from Tires.** C. E. Snyder, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,222,393. **Anti-Skid Chain.** J. M. Benjamin, Philadelphia, Pa.
2,222,771. **Plastic Closure** for Containers. H. O. Hoffman, assignor to Faultless Rubber Co., both of Ashland, O.
2,222,786. **Anti-Skid Device for Dual Tires.** W. H. Snyder, Elkins Park, Pa.
2,223,423. **Tire Pressure Warning Device.** E. L. Lunde, Sioux City, Ia.
2,223,750. **Knitting Elastic Top Hosiery.** P. L. Thurston, Martinsburg, W. Va., and L. B. Wilcox, Westfield, assignors to Interwoven Stocking Co., New Brunswick, both in N. J.
2,223,751. **Circular Knitting Machine** for Elastic and Non-Elastic Threads. P. L. Thurston, D. Nagley, and H. F. Hilker, all of Martinsburg, W. Va., assignors to Interwoven Stocking Co., New Brunswick, N. J.
2,223,824. **Tire Chain.** W. F. Helwig, Milwaukee, Wis.
3,223,915. **Tire Spreader.** J. P. Lambert, Wapato, Wash.
2,224,042. **Air-Pressure Control Means** for Tires. V. W. and L. F. Embree, both of Onida, S. Dak.
2,224,706. **Control System** for Machine Gun. F. J. Tarris and D. Webb, assignors to India Rubber, Gutta Percha & Telegraph Works Co., Ltd., all of London, England.
2,224,798. **Tire Pressure Indicating Means.** V. M. Pyatt, Great Falls, Mont.
2,224,879. **Tire Chain.** P. J. Nagle, deceased, assignee of W. J. Englert, Rochester, N. Y.; H. J. and R. A. Nagle and R. H. Tew, executors of P. J. Nagle.
2,225,041. **Tire Grooving Apparatus.** C. Edinger, Inglewood, Calif.
2,225,298. **Asphaltum Insulated Weatherproof Wire.** W. E. Cook, West New Brighton, N. Y.
2,225,354. **Process and Apparatus to Manufacture Carbon Black.** A. Schmalenbach, Essen, Germany, assignor, by mesne assignments, to Koppers Co., Pittsburgh, Pa.

Dominion of Canada

392,439. **Tire Chain.** American Chain & Cable Co., Inc., New York, N. Y., assignee of G. S. Schmidt, York, Pa., both in the U. S. A.
392,467. **Die Forming Method.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of A. W. Bull, Grosse Pointe, Mich., U. S. A.
392,485. **Tire Chain Tool.** H. K. Porter, Inc., Everett, assignee of H. W. Porter, Brookline, and F. T. Lind, Everett, co-inventors, all in Mass., U. S. A.
392,801. **Dolomitic Magnesium Carbonate Composition.** Plant Rubber & Asbestos Works, San Francisco, assignee of D. H. Grunwald, Alameda, both in Calif., U. S. A., administratrix of the estate of B. B. Grunwald, deceased, in his lifetime of Alameda, Calif.
392,809. **Hose Coupling.** Resistoflex Corp., Belleville, N. J., assignee of A. N. Troshkin, New York, N. Y., both in the U. S. A.
393,000. **Tire Anti-Skid Device.** J. J. Larkin, Richmond, P. Q.

United Kingdom

527,279. **Valves** for Pneumatic-Tire Tubes. Dunlop Rubber Co., Ltd.
527,950. **Couplings** for Pipes, Flexible Hose, Etc. Deutsche Waffen- Und Munitions-Fabriken A. G.
528,015. **Reciprocating Pumps** for Delivering Liquid. Dunlop Rubber Co., Ltd., G. E. Beharrell, J. Wright, and H. Trevaskis.
528,176. **Hydraulically Operated Brake Mechanisms.** India-Rubber, Gutta Percha & Telegraph Works Co., Ltd., F. J. Tarris, and D. Webb.
528,177. **Testing the Balance of Annular or Rotary Articles.** Dunlop Rubber Co., Ltd., and E. T. Braund.
528,221. **Packing Elastic Webbing and Package Resulting Therefrom.** J. W. Adams and W. J. Adams & Co., Ltd.
528,495. **Couplings** for Pneumatic-Tire Valves. H. Turner and T. Brown.

TRADE MARKS

United States

382,938. **Tumble Tops.** Drinking glass covers. I. B. Kleinert Rubber Co., New York, N. Y.

382,948. **Wave-Rite.** Combs. Vulcanized Rubber Co., New York, N. Y.
382,956. **Craft-Cord.** Soles and heels. Lima Cord Sole & Heel Co., Lima, O.
382,968. **Lyttonian.** Clothing and footwear. Hub-Henry C. Lytton & Sons, Chicago, Ill.
382,970. **Bias-cup.** Brassieres. Model Brassiere Corp., Brooklyn, N. Y.
382,975. **Nu-Go.** Footwear. L. Gottlieb, New York, N. Y.
382,999. **Ammocure.** Raincoats. United States Rubber Co., New York, N. Y.
383,005. **Footloose.** Footwear. Holmes, Stickney & Walker, Inc., Portland, Me.
383,020. **Socko.** Footwear. Gotham Shoe Mfg. Co., Inc., Binghamton, N. Y.
383,024. **Campus Debs.** Footwear. A. Werman & Sons, Inc., New York, N. Y.
383,027. **Cushion Magic.** Footwear. Daly Bros. Shoe Co., Inc., Boston, Mass.
383,067. **Hi-Climber.** Conveyer belts. Whitehead Bros. Rubber Co., Trenton, N. J.
383,070. **Dynamic.** Rubber grips for fishing rod handles, fishing tackle. American Fork & Hoe Co., Cleveland, O.
383,115. **Glas-Styk.** Rubber applicator and glass cleaning and polishing powder. L. J. Kurtz, Cleveland, O.
383,160. **Daintette.** Catamenial appliance. Mon Docteur Importing Co., Inc., Middlefield, Conn.
383,169. Representation of a rectangular label containing the words: **"Froshtown Shoes."** Footwear. Eastern-Columbia, Inc., Los Angeles, Calif.
383,184. **Factex.** Rubber substitutes—vulcanized fatty oils and acids. Stamford Rubber Supply Co., Stamford, Conn.
383,225. **Asbeston.** Asbestos tape and fabric. United States Rubber Co., New York, N. Y.
383,253. **Foamflex.** Toys. Toyad Corp., Latrobe, Pa.
383,323. **Spirit of Youth by Salle-Ann.** Girdles and brassieres. Salle Ann Shops., Inc., St. Louis, Mo.
383,340. **Vitaflex.** Elastics. Shelton Textile Fabric Co., Shelton, Conn.
383,391. **Nylies.** Foundation garments. Formfit Co., Chicago, Ill.
383,437. **Greenlawn.** Flocked rubberized fabric. Pocono Co., Trenton, N. J.
383,438. **Art Weave.** Druggists' sundries. Armstrong Cork Co., Lancaster, Pa.
383,439. **Gold Leaf.** Druggists' sundries. Armstrong Cork Co., Lancaster, Pa.
383,440. **Silver Leaf.** Druggists' sundries. Armstrong Cork Co., Lancaster, Pa.
383,441. **Topper.** Druggists' sundries. Armstrong Cork Co., Lancaster, Pa.
383,472. **Reprene.** Hose, belting, and packing. Lee Rubber & Tire Corp., doing business as Republic Rubber Div., Youngstown, O.
383,515. **Speedliner.** Tire casings. B. F. Goodrich Co., New York, N. Y.
383,518. **Sleepytime Pal.** Toys. Toyad Corp., Latrobe, Pa.
383,581. **Quilt.** Druggists' sundries. Armstrong Cork Co., Lancaster, Pa.

Financial

(*Continued from page 57*)

General Cable Corp., New York, N. Y. September quarter: net profit, $467,-987, equal after quarterly dividend requirements on 150,000 shares of 7% preferred stock on which is an accumulation of unpaid dividends, to 67¢ each on 306,689 shares of $4 Class A stock, against $768,156, or 29¢ each on 664,558 shares of no-par common after dividend requirements on 7% preferred and Class A stocks in the June quarter and $214,-415, or $1.43 a share on 7% preferred in the September quarter of 1939. Nine months to September 30: Net profit, $1,-963,568, equal to 38¢ a common share, against $44,135, or 29¢ a preferred share last year.

Thermoid Co., Trenton, N. J., and domestic subsidiary. September quarter: net profit, subject to audit, $144,221, equal, after dividend requirements on preferred stock on which is an accumulation of unpaid dividends, to 24¢ a share on 476,388 common shares, against $75,555, or 9¢ a common share in the third quarter of 1939. Year ended September 30: net profit, $594,239, or $1 a common share, against $333,835, or 45¢ a common share, for the preceding 12 months.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. First ten months, 1940: net income, $15,994,862, against $10,433,652 for the first ten months of 1939; orders booked, $318,363,706, against $176,896,557; unfilled orders, $186,898,589, against $66,106,725; taxes, $15,643,405, against $8,086,577.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. Nine months to September 30: net profit, $178,452, after foreign exchange loss, interest, and $45,000 provision for foreign contingencies, but excluding operations of French subsidiary subsequent to March 31, equal to 61¢ each on 294,230 capital shares, against $38,926, or 13¢ each on 295,150 shares in the first nine months of 1939; net sales, $6,415,867, against $6,326,679.

Tire Production Statistics

Pneumatic Casings

	Inventory	Production	Shipments
1938	8,451,390	40,906,735	43,132,302
1939	8,664,505	57,612,731	57,508,775
1940			
Jan.	9,347,953	4,953,585	4,270,137
Feb.	10,123,824	4,888,250	4,112,379
Mar.	10,747,370	5,007,042	4,345,674
Apr.	10,881,029	5,105,953	5,009,762
May	10,576,217	5,415,314	5,720,249
June	8,881,101	5,147,871	6,926,553
July	9,299,014	4,675,773	4,284,086
Aug.	9,732,108	4,703,522	4,244,782
Sept.	9,809,196	4,495,402	4,572,311
Oct.	9,447,962	5,081,939	5,560,709
Nov.	9,118,243	4,837,501	5,136,744

Pneumatic Casings

	Original Equipment	Replacement Sales	Export Sales
1938	10,716,130	30,565,008	1,048,934
1939	18,207,556	38,022,034	1,279,185
1940			
Jan.	1,804,826	2,376,455	88,856
Feb.	1,974,466	2,051,487	86,426
Mar.	2,050,250	2,217,627	77,797
Apr.	2,095,220	2,823,293	91,249
May	1,998,735	3,635,652	85,862
June	1,925,420	4,918,341	82,792
July	857,684	3,377,166	79,949
Aug.	704,565	3,386,629	82,314
Sept.	1,464,925	2,948,797	97,942
Oct.	2,322,313	3,098,371	140,025
Nov.	2,437,692	2,576,816	122,236

Inner Tubes

	Inventory	Production	Shipments
1938	8,165,696	37,847,656	40,292,614
1939	7,035,671	50,648,556	51,190,314
1940			
Jan.	7,633,798	4,286,924	3,826,667
Feb.	7,896,960	4,210,904	3,809,733
Mar.	8,182,655	4,399,550	4,113,735
Apr.	8,258,331	4,618,361	4,542,735
May	8,243,050	4,739,072	4,738,668
June	6,841,281	4,359,486	5,721,096
July	7,093,996	4,027,565	3,797,325
Aug.	7,802,303	4,326,827	3,614,871
Sept.	7,950,104	4,114,850	3,991,182
Oct.	7,647,462	4,556,593	4,877,770
Nov.	7,055,352	4,111,392	4,691,763

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

MIDWEST

Thirty-three rubber firms in the Midwest recently reported paying 16,404 employes $408,000 in wages, rises of 7.8% and 2.1%, respectively, over the previous month.

Harris Products Co., Detroit, Mich., according to General Manager R. G. Bradley, has opened a new plant and branch sales office at 5105 Cowan Ave., Cleveland, O., which will manufacture the major portion of its output of "Torflex" rubber and neoprene backed bushings. The new plant has a daily capacity of 30,000 bushings that can easily be increased to 100,000. Although the greater part of the production is to be in Ohio, some manufacturing facilities will still be maintained at Detroit,

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	70,800¶	9,552	15,426	9,593	32,508	33,751§	62,344§	12,582§	42,351	5,415§	7,965a	14,000*	61,866	603,842¶
1940															
Jan. ..	71,541	....	1,049	921	891	5,047	....	....	....	4,547	....	....	....	....	....
Feb. ..	41,797	....	565	1,846	694	3,508	....	....	....	5,243	....	....	....	....	....
Mar. ..	58,283	....	756	1,784	....	3,062	....	....	....	6,057	....	....	....	....	....
Apr. ..	70,135	....	606	1,612	....	3,096	....	....	....	2,000*	....	....	....	....	....
May ..	50,621	....	589	2,100	....	3,108	....	....	....	2,500*	....	....	....	....	....
June ..	53,266	....	543	1,181	....	1,062	....	....	....	3,000*	....	....	....	....	....
July ..	69,374	....	783	1,902	....	5,112	....	....	....	3,000*	....	....	....	....	....
Aug. ..	72,612	....	767	2,456	....	4,605	....	....	....	4,500*	....	....	....	....	....
Sept. ..	73,843	....	....	2,485	....	2,743	....	....	....	....	....	....	....	....	....

*Estimated, and to Aug. 31, 1939, only. †U. K. figures show gross imports, not net imports. ‡Including imports of Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only §Up to July 31, 1939, only. aUp to Sept. 30, 1939. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

where engineering design, development, and testing capacities are being enlarged. The last involves some newly developed equipment, soon to be announced, for testing rubber under conditions similar to those found in actual service.

Monsanto Chemical Co., St. Louis, Mo., has named Frederick C. Renner, assistant manager of the New York branch, to the post of assistant manager of sales of the organic chemicals division, St. Louis, made vacant January 1 after Harvey M. Harker left to assist in the development of Monsanto interests in Australia. Clare F. Trombley, in charge of sales of organic chemicals and phosphate division products at the Everett, Mass., office, has been made assistant general branch manager of the New York district sales office. His successor at Everett is Thornton C. Jesdale, formerly assistant manager of the Chicago, Ill., branch.

RUBBER SCRAP

THE demand for scrap rubber during December continued at a high level, with reclaim production active. Collections of scrap were reported to be slowing up because of the winter. During October, Japan continued to take a large proportion of our scrap exports, 7,712,649 pounds out of a total of 9,918,964 pounds, according to the Department of Commerce. The market continued firm with price advances registered on the following grades on scrap: No. 2, compound tubes; red tubes; mixed tubes; auto tire carcass; black auto peelings; and mixed black mechanicals.

Consumers' Buying Prices

(Carlot Lots for December 23, 1940)

Boots and Shoes		Prices
Boots and shoes, black	lb.	$0.01⁹/₁₀/$0.01¾
Colored	lb.	.00⅞/ .01
Untrimmed arctics	lb.	.00⅞/ .01

Inner Tubes		Prices
No. 1, floating	lb.	.11 / .12
No. 2, compound	lb.	.05¼/ .05½
Red	lb.	.04¾/ .05
Mixed tubes	lb.	.04¼/ .04⅝

Tires (Akron District)			
Pneumatic Standard			
Mixed auto tires with beads	ton	15.00	/15.50
Beadless	ton	18.50	/19.00
Auto tire carcass	ton	45.00	/47.00
Black auto peelings	ton	46.00	/48.00
Solid			
Clean mixed truck	ton	32.00	/34.00
Light gravity	ton	42.00	/44.00

Mechanicals			
Mixed black scrap	ton	33.00	/34.00
Hose, air brake	ton	22.00	/24.00
Garden, rubber covered	ton	12.00	/14.00
Steam and water, soft	ton	12.00	/14.00
No. 1 red	lb.	.03½/	.03¾
No. 2 red	lb.	.02½/	.02¾
White druggists' sundries	lb.	.03¼/	.04
Mixed mechanicals	lb.	.02¼/	.02½
White mechanicals	lb.	.03¾/	.04

Hard Rubber		
No. 1 hard rubber	lb.	.11½/ .13

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

		July, 1940		August, 1940		September, 1940		October, 1940	
UNMANUFACTURED		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Crude rubber, etc	lb.	11,093,800	$2,162,828	9,987,073	$2,020,384	6,060,836	$1,219,245	18,056,804	$3,600,115
Latex (dry weight)	lb.	356,505	95,190	327,222	93,488	83,938	23,980	616,935	185,074
Gutta percha	lb.	1,926	443	.....	.....	318	86	2,580	582
Rubber, covered	lb.	865,500	44,100	2,233,300	109,289	1,739,900	82,689	1,529,900	80,347
Rubber, powdered, and gutta percha scrap	lb.	109,800	4,599	741,000	10,589	6,851,000	13,456	378,000	5,698
Balata	lb.	64	43	338	93	468	340	696	120
Rubber substitute	lb.	36,900	9,627	46,000	11,783	23,600	7,392	43,200	14,533
Totals		12,464,495	$2,316,830	13,334,933	$2,245,626	14,760,060	$1,347,188	20,628,115	$3,886,469
PARTLY MANUFACTURED									
Hard rubber comb blanks		.....	$2,688	.....	$4,686	.....	$6,984	.....	$4,485
Hard rubber, n. o. s.	lb.	889	896	3,113	1,530	3,573	3,623	7,397	8,179
Rubber thread not covered	lb.	2,128	1,829	4,348	3,302	1,160	1,034	2,755	2,756
Totals		3,017	$5,413	7,461	$9,518	4,733	$11,641	10,152	$15,420
MANUFACTURED									
Bathing shoes	prs.	144	$57	.....	.....	.....	.....	.....	.....
Belting		.....	11,622	.....	$25,718	.....	$7,353	.....	$21,212
Hose		.....	35,430	.....	28,899	.....	24,640	.....	21,560
Packing		.....	9,196	.....	8,677	.....	7,984	.....	10,441
Boots and shoes	prs.	49	143	465	1,341	899	588	883	864
Canvas shoes with rubber soles	prs.	13,681	3,734	3,053	886	21	17	924	589
Clothing, including water-proofed		.....	3,196	.....	4,450	.....	2,716	.....	3,619
Raincoats	no.	923	5,396	1,512	7,138	1,479	7,190	964	4,609
Gloves	doz. prs.	666	2,043	484	2,090	626	1,520	583	1,924
Hot water bottles		.....	3,861	.....	3,404	.....	115	.....	116
Liquid rubber compound		.....	.....	.....	.....	.....	.....	.....	.....
Tires, bicycle	no.	2,946	1,904	5,424	2,803	4,752	1,967	1,252	860
Pneumatic	no.	15,053	561,003	23,609	853,391	25,391	1,116,072	31,642	1,730,308
Solid for automobiles and motor trucks	no.	31	994	11	757	6	393	53	2,863
Other solid tires		.....	497	.....	2,798	.....	2,326	.....	1,475
Inner tubes	no.	13,694	64,672	22,998	125,846	24,899	155,683	31,027	251,642
Bicycle	no.	940	224	5,640	1,020	359	87	99	25
Mats and matting		.....	4,639	.....	4,739	.....	14,051	.....	7,796
Cement		.....	12,266	.....	20,353	.....	9,878	.....	6,402
Golf balls	doz. prs.	3,867	7,193	3,810	8,128	542	1,298	570	894
Heels	prs.	2,480	175	4,964	670	4,584	483	6,424	506
Other rubber manufactures		.....	157,395	.....	159,057	.....	167,895	.....	191,522
Totals		.....	$885,640	.....	$1,262,165	.....	$1,522,256	.....	$2,268,227
Totals, rubber imports		.....	$3,207,883	.....	$3,517,309	.....	$2,881,085	.....	$6,170,116

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED								
Waste rubber	$17,990	.....	$15,558	.....	$20,095	.....	$11,016	.....
MANUFACTURED								
Belting	$41,531	.....	$45,778	.....	$36,854	.....	$45,438	.....
Bathing caps	.....	.....	.....	.....	.....	.....	.....	.....
Canvas shoes with rubber soles	34,256	.....	30,211	.....	45,488	.....	66,258	.....
Boots and shoes	640,586	.....	291,046	.....	259,784	.....	290,981	.....
Clothing, including water-proofed	17,890	.....	29,085	.....	23,544	.....	23,336	.....
Heels	15,620	.....	3,877	.....	1,182	.....	2,578	.....
Hose	75,865	.....	207,140	.....	188,365	.....	48,773	.....
Soles	13,259	.....	911	.....	810	.....	4,378	.....
Soling slabs	3,639	.....	380	.....	119	.....	.....	.....
Tires, pneumatic	313,437	.....	349,583	.....	300,268	.....	359,639	.....
Not otherwise provided for	.....	.....	.....	.....	.....	.....	.....	.....
Inner tubes	33,749	.....	41,105	.....	34,103	.....	42,048	.....
Other rubber manufactures	43,626	.....	38,132	.....	32,576	.....	54,014	.....
Totals	$1,233,458	.....	$1,037,248	.....	$923,093	.....	$937,443	.....
Totals, rubber exports	$1,251,448	.....	$1,052,806	.....	$943,188	.....	$948,459	.....

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
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Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

RUBBER CHEMIST, ELEVEN YEARS' EXPERIENCE WITH large and small companies in compounding and processing rubber goods and all synthetics, here and abroad. Good experience with latex, airfoam sponge, cushions, and dipped goods. Available on short notice. Location immaterial, also South America. Excellent references. Practical man. 37 years old. Address Box No. 192, care of INDIA RUBBER WORLD.

CHEMIST, PRODUCTION MAN; YOUNG, ABLE COMPOUNDER, solid factory experience processing natural, synthetics. Can handle men; experienced footwear, rollers, calendered, molded goods. Available short notice. Address Box No. 197, care of INDIA RUBBER WORLD

IMMEDIATELY AVAILABLE—TECHNICAL SALES EXECUTIVE with long and varied selling and sales promotional experience in organic chemicals, synthetics and general chemicals with special reference to the rubber industry. Address Box No. 199, care of INDIA RUBBER WORLD.

SUPERINTENDENT AND DEVELOPMENT ENGINEER DESIRES change. Eighteen years' experience in the manufacture of mechanicals, synthetic and sponge rubber goods. Well educated. Capable compounder. Address Box No. 202, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, EMPLOYED IN MIDWEST, 3 YEARS' EXperience in research and compounding of natural rubber and synthetics as assistant to chief chemist. Knowledge of factory processes. Can organize and direct plant laboratory. Consider responsible position only. Location secondary. Address Box No. 204, care of INDIA RUBBER WORLD.

FRENCH RUBBER MANUFACTURER WHO OWNED and managed a factory producing rubber footwear, hose and other mechanical goods and who employed 600 workers has just arrived in this country. Having started this business years ago all by himself, this man knows compounding, manufacturing, and organization from beginning to end. He speaks 5 languages, including English. He seeks a connection with a rubber company where his experience can be mutually advantageous. Address Box No. 206, care of INDIA RUBBER WORLD.

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RUBBER COMPOUNDER. COLLEGE GRADUATE. THREE TO five years' experience in compounding and processing Mechanical Rubber Goods. Experience in Extruded Goods preferred. Large manufacturer in the East. State age, education, experience, and salary desired. Address Box No. 194, care of INDIA RUBBER WORLD.

FOREMAN MOLDED GOODS DEPARTMENT, THOROUGHLY EXperienced in production of precision molded mechanicals subject to close tolerance inspection. Must be able supervisor and coordinator of labor. Eastern location. State age, experience in DETAIL, references, and salary desired. Address Box No. 195, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER COMPOUNDER WITH TECHNICAL background, if possible, for position in Metropolitan District. Prefer man with background of experience in quarterlinings, both plain and lacquered. Give full details in first letter. Address Box No. 196, care of INDIA RUBBER WORLD.

WANTED: THOROUGHLY EXPERIENCED CLOTHING OR PROOFing calender man. With application submit full record of experience on all types of calender work. Address Box No. 200, care of INDIA RUBBER WORLD.

RUBBER BANDS—PRODUCTION MAN. FULLY EXPERIENCED compounding and manufacturing on tubing machine. Take charge. Near New York City. Address Box No. 207, care of INDIA RUBBER WORLD.

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WANTED TO RENT OR BUY: RUBBER PLANT. GIVE FULL details as to building size, machinery, transportation facilities, etc. Location immaterial. Address Box No. 203, care of INDIA RUBBER WORLD.

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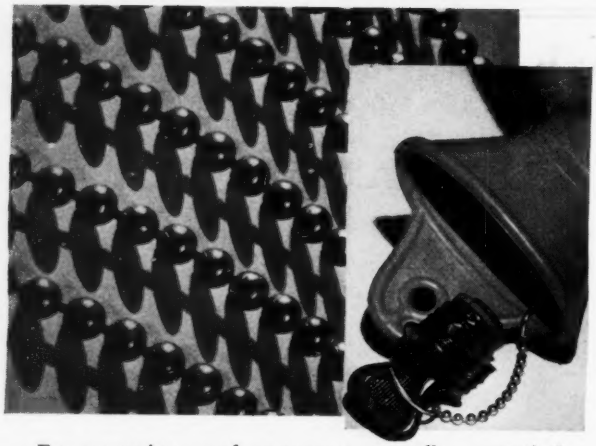
(Advertisements continued on page 85)



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is available in varied sizes, metals and finishes. With our 25 years' experience we are prepared to cooperate in developing suitable assemblies of BEAD CHAIN* for your use.

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NEW — and more valuable than ever. For the past 13 years The Schuster Calender Gauge has proven itself an outstanding and indispensable instrument in the rubber industry. *Now* it automatically adjusts your rolls to a predetermined thickness and correctly maintains that thickness. Coatings for tire fabric and similar uses are kept accurate and uniform *automatically*. The result is a better product at a lower cost. Write us today for complete particulars.

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Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	Commodity	City and Country
437	Rubber specialties for nursing and sanitary purposes	Medan, Sumatra
454	Druggists' supplies, syringes, etc	Padang, Sumatra
464	Rubberized canvas for shoe manufacture	Cairo, Egypt
485	Rubber solution for pasting leather soles to felt or canvas	Cairo, Egypt
500	Casings and inner tubes for cars and trucks; tire repair materials; tires for motorcycles and bicycles; rubberized bed sheeting	Zagreb, Yugoslavia

Imports by Customs Districts

	October, 1940		October, 1939	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Massachusetts	24,041,388	$4,304,958	11,794,258	$1,963,302
St. Lawrence	.....	.....	2,234	341
New York	107,076,257	18,047,155	76,042,272	12,039,764
Philadelphia	1,127,061	178,218	935,638	143,820
Maryland	21,921,645	3,829,182	1,573,332	242,440
Virginia	670,451	105,972	.....	.....
Mobile	162,397	28,310	1,419,540	208,041
New Orleans	6,114,241	1,003,368	3,505,406	554,252
San Antonio	39,000	4,279	.....	.....
El Paso	44,800	3,893	.....	.....
Galveston	.....	.....	45,100	6,687
Los Angeles	4,130,571	721,521	6,415,359	1,009,315
San Francisco	662,246	113,754	458,936	73,242
Oregon	78,400	13,328	.....	.....
Washington	1,250	238	.....	.....
Ohio	174,603	35,354	.....	.....
Colorado	1,120,000	175,507	.....	.....
Totals	167,364,310	$28,565,037	102,192,075	$16,241,204

*Crude rubber including latex dry rubber content.

Book Reviews

(*Continued from page 67*)

distances, dissociation energies, natural vibrations, group frequencies, internal molecular potential, free rotation, cis-trans-isomerism); Primary and Secondary Valences (formation of molecule aggregates, molecular association, and intermolecular forces); Crystal Structure, Lattice Forces and Chemical Structure of the Unit Cell (classification from the aspect of forces and from the aspect of symmetry); Molecular Arrangement in Liquids and the Investigation of Very Minute Crystals (scattering of X-Rays in liquids, determination of size and form with X-rays, observations on mesophases or crystalline liquids); The Behavior of Mixtures (investigation of high polymeric substances in solution, formation of binary mixtures, lowering of vapor pressure in binary mixtures, osmotic phenomena, and viscosity); and Kinetic Phenomena in High Polymer Chemistry (phenomena of diffusion and the mechanism of formation and degradation of long-chain molecules).

GUATEMALA

The Bata Shoe Co. has obtained concessions from Guatemala to establish a local factory. The new concern, Compania Guatemaltecu Incatecu, S.A., will cultivate rubber and develop the manufacture of rubber goods and also tan leather and produce footwear from native textiles. It is permitted free entry of the necessary machinery (original installation only) and of furniture not obtainable locally, as well as iron for construction purposes. The company is also granted a drawback of 80% in custom duties on raw materials imported for use in making goods for export from Guatemala. At least 80% of the employes must be Guatemalans, but five administrative experts, five rubber specialists and three tanning and shoe technicians will be permitted to enter, but they must be Czechoslovakians now residing in the United States, Canada, or Haiti.

Classified Advertisements

Continued

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FOR SALE: 1—Farrel 24″x24″ 12 deck, Hydraulic Press, 15″ ram; 12—24″x48″ Hydraulic Presses, 14″ ram; 7—Triplex Hydraulic Pumps, 18 to 35 GPM, 1500 to 3000 lbs. per sq. inch; also Mills, Calenders, Tubers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: ONE 68 H.P. BERTHOLD ELECTRIC MOTOR, 220 Volts, 208 Amps., 300 R.P.M. In Akron, O. Address Box No. 193, care of INDIA RUBBER WORLD.

LIQUIDATION RUBBER MACHINERY, INCLUDING 2 U. S. Bureau of Standards Dynamometer Testing Apparatus; Lot of Complete Tire Molds; 75-foot Link-Belt Conveyer, 36″ wide. Also many other items. Address Box No. 198, care of INDIA RUBBER WORLD.

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WANTED FOR USER: 1—NO. 3 or NO. 9 BANBURY MIXER: 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. No dealers. Address Box No. 201, care of INDIA RUBBER WORLD.

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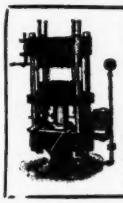

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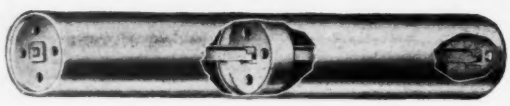
ALL STEEL ALL WELDED CALENDER STOCK SHELL



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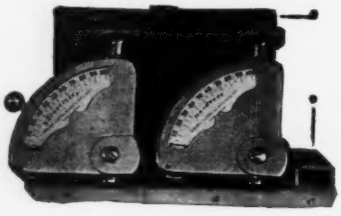

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FINELY PULVERIZED—BRILLIANT
COLORS
for RUBBER

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Manufactured by
BROOKLYN COLOR WORKS, INC.
Morgan and Norman Avenues Brooklyn, N. Y.

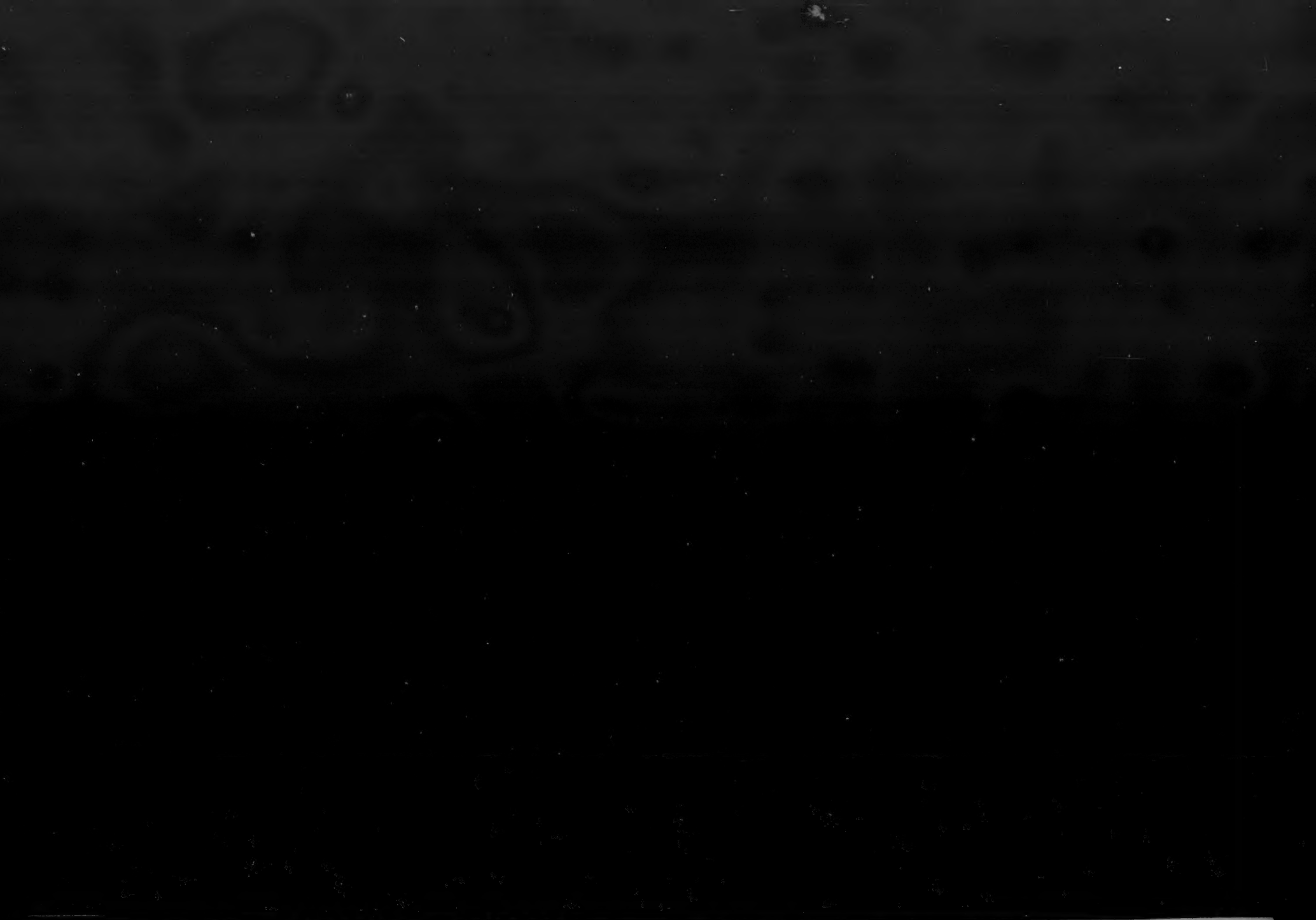
United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	September, 1940 Quantity	September, 1940 Value	Nine Months Ended September, 1940 Quantity	Nine Months Ended September, 1940 Value
UNMANUFACTURED—*Free*				
Liquid latex (solids)....*lb.*	6,614,718	$1,337,487	59,211,970	$11,372,270
Jelutong or pontianak....*lb.*	1,595,330	246,641	10,650,059	1,572,796
Balata ....*lb.*	87,599	19,245	1,023,006	178,998
Gutta percha ....*lb.*	630,538	155,232	3,594,078	635,123
Guayule ....*lb.*	559,000	49,845	5,783,121	539,548
Scrap and reclaimed....*lb.*	707,562	12,430	7,357,312	138,512
Totals	10,194,747	$1,820,880	87,619,546	$14,437,247
Misc. rubber (above), 1,000 *lbs.*	10,195	$1,820,880	87,619	$14,437,247
Crude rubber ....1,000 *lbs.*	169,724	29,317,540	1,217,408	211,799,340
Totals ....1,000 *lbs.*	179,919	$31,138,420	1,305,027	$226,236,587
Chicle, crude ....*lb.*	178,525	$51,489	8,169,777	$2,655,671
MANUFACTURED—*Dutiable*				
Rubber tires ....*no.*	1,234	$3,069	34,168	$197,485
Rubber boots, shoes and overshoes ....*prs.*	3,625	1,558	68,377	17,932
Rubber soled footwear with fabric uppers ....*prs.*	111,651	20,617	999,257	186,069
Golf balls ....*no.*	9,600	1,339	533,518	49,895
Lawn tennis balls....*no.*	36	6	908,721	89,053
Other rubber balls....*no.*	178,420	2,137	1,660,155	45,502
Other rubber toys....	.....	288	.....	19,776
Hard rubber combs....*no.*	.....	.....	.....	.....
Other manufactures of hard rubber	.....	28	.....	14,730
Friction or insulating tape..*lb.*	2,745	2,748	52,895	33,334
Belts, hose, packing, and insulating material	.....	4,025	.....	76,246
Druggists' sundries of soft rubber	.....	1,136	.....	28,358
Inflatable swimming belts, floats, etc. ....*no.*	.....	.....	428,843	29,046
Other rubber and gutta percha manufactures	.....	26,974	.....	254,942
Totals	.....	$63,925	.....	$1,042,368

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ....*lb.*	1,491,204	$349,443	14,362,666	$2,927,478
Balata ....*lb.*	14,556	3,563	315,688	98,781
Other rubber, rubber substitutes and scrap....*lb.*	.....	.....	172,147	23,697
Rubber manufactures (including toys)	.....	2,079	.....	31,482
Totals	.....	$355,085	.....	$3,081,438

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ....*lb.*	2,309,212	$107,352	20,778,976	$1,031,373
Scrap ....*lb.*	8,557,550	140,689	63,520,086	1,177,064
Cements ....*gal.*	17,059	18,664	312,897	393,745
Rubberized auto cloth..*sq. yd.*	14,715	7,298	197,375	87,697
Other rubberized piece goods and hospital sheetings..*sq. yd.*	217,889	119,518	1,801,262	690,761
Boots ....*prs.*	3,359	6,924	86,001	179,832
Shoes ....*prs.*	4,894	4,943	141,477	91,931
Canvas shoes with rubber soles ....*prs.*	33,050	24,621	437,090	350,735
Soles ....*doz. prs.*	4,065	9,869	34,812	69,964
Heels ....*doz. prs.*	23,194	12,933	220,954	127,719
Soling and top lift sheets..*lb.*	32,970	5,570	490,816	94,778
Gloves and mittens..*doz. prs.*	3,293	8,534	80,767	191,230
Water bottles and fountain syringes ....*no.*	23,301	8,805	251,462	84,819
Other druggists' sundries....	.....	67,510	.....	614,459
Gum rubber clothing....*doz.*	15,081	26,602	172,402	380,990
Balloons ....*gross*	17,492	16,634	169,393	149,263
Toys and balls....	.....	27,724	.....	139,709
Bathing caps....*doz.*	2,536	3,939	43,189	75,217
Bands ....*lb.*	4,485	1,901	143,543	67,759
Erasers ....*lb.*	18,568	8,675	193,550	108,844
Hard rubber goods				
Electrical battery boxes..*no.*	19,735	15,242	196,803	139,896
Other electrical....*lb.*	43,786	12,807	409,966	152,498
Combs, finished....*doz.*	16,710	7,519	171,648	95,935
Other hard rubber goods....	.....	17,558	.....	132,096
Tires				
Truck and bus casings..*no.*	61,421	1,603,520	376,270	8,730,701
Other auto casings....*no.*	26,289	257,153	383,585	4,187,374
Tubes, auto ....*no.*	72,586	212,905	582,000	1,275,812
Other casings and tubes..*no.*	14,337	96,878	88,655	750,194
Solid tires for automobiles and motor trucks....*no.*	904	15,575	4,336	86,798
Other solid tires....*lb.*	9,771	2,403	302,998	53,065
Tire sundries and repair materials ....*lb.*	154,848	46,243	1,932,167	547,568
Rubber and friction tape..*lb.*	30,280	10,054	563,000	159,521
Fan belts for automobiles..*lb.*	18,466	11,059	293,207	157,666
Other rubber and balata belts ....*lb.*	193,674	103,101	2,361,594	1,262,291
Garden hose ....*lb.*	35,058	9,473	662,841	138,814
Other hose and tubing....*lb.*	454,744	214,828	6,508,171	2,706,942
Packing ....*lb.*	141,352	67,300	1,106,254	537,460
Mats, matting, flooring, and tiling ....*lb.*	104,480	13,704	843,367	117,236
Thread ....*lb.*	9,505	10,029	563,759	416,280
Gutta percha manufactures..*lb.*	5,787	3,314	1,008,951	307,769
Latex (d.r.c.) and rubber sheets processed for further manufacture....*lb.*	50,333	11,367	941,353	258,246
Other rubber manufactures..	.....	162,952	.....	1,710,527
Totals	.....	$3,533,689	.....	$30,032,578